Master Landscape Construction Specifications

MASTER LANDSCAPE CONSTRUCTION SPECIFICATION CHECKLIST

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SECTION 01000

PROJECT INFORMATION

PART 1 GENERAL

1.01 NOTICE TO PROCEED

A. The Notice to Proceed will normally be issued no later than 30 calendar days following the award of contract.

B. The Contractor will be required to attend a performance conference located at the _____ Air Force Base Contracting Office, Building ____.

1.02 NORMAL DUTY HOURS

The Normal Working hours are from 7:30 a.m. to 4:15 p.m., Monday through Friday, excluding holidays. The lunch period for contractors requiring escorts is from 11:30 a.m. to 12:30 p.m. Access to work sites will be restricted to these hours and days, unless approved otherwise by the Contracting Officer. The Contractor shall submit all requests for permission to work during other than Normal Working Hours to the Contracting Officer, in writing, not less than three (3) working days prior to each period of work scheduled for other than Normal Working Hours.

1.04 GOVERNMENT HOLIDAYS

A.

HOLIDAY	DATE
New Year's Day	January 1
Martin Luther King, Jr.'s Birthday	3rd Monday in January
Washington's Birthday	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	4 July
Labor Day	1st Monday in September
Columbus Day	2nd Monday in October
Veteran's Day	November 11
Thanksgiving Day	4th Thursday in November
Christmas Day	December 25

B. Any Government Holidays falling on a Saturday will be observed on the preceding Friday; holidays falling on a Sunday will be observed on the following Monday.

1.05 SUBMITTALS

Submittals will be required on all materials used under each proposal. See Section 01300 for more information.

1.06 FIRE PREVENTION

A. The Contractor will be required to comply with applicable installation fire regulations; this regulation is available for inspection at _____.

B. It is the responsibility of the Contractor to practice good fire prevention measures while performing work. Notifications and Questions concerning fire prevention can be referred to the Technical Services Section. The following criteria shall be adhered to at all times:

1. No smoking in or on any building.

2. Flammable paints, oils, varnishes, etc., must be stored inside in a metal storage cabinet or outside in a controlled area. Flammables being used are limited to one day's supply.

3. Temporary wiring shall be in compliance with Article 305 of the National Electric Code.

4. The Contractor shall notify the Contracting Officer prior to any alarm or sprinkler shut down or shut off, 24 hours in advance, on DD Form 1104.

5. Welding, cutting, brazing, or the operation of any open flame devices shall be done only upon the approval and issue of a permit.

6. Fire extinguishers required during the construction shall be supplied by the Contractor.

7. The Contractor shall provide notice before the use of any fire hydrants.

C. No welding will be permitted without obtaining a welding permit issued by _____ AFB Fire Department. All fire and safety regulations are to be followed.

D. The Contractor shall comply with fire prevention practices as set forth by the National Fire Protection Association and other recognized fire prevention agencies.

E. The Contractor shall comply with OSHA Standard 1910.243(d) when utilizing explosive operated hand tools. Storage of explosive cartridges on the installation will be in metal containers and limited to one days' supply. The Contractor will provide adequate controls to prevent loss/theft of cartridges used and stored on the installation.

F. Power driven fasteners may be used only when approved in writing.

1.07 REFUSE

A. The Contractor shall take positive action to prevent work-generated refuse from entering the sewer system.

B. All Contractor-generated refuse and waste shall be hauled from the construction site daily to a disposal area to be selected by the Contractor and shall be located outside the physical boundaries of the installation. This refuse and waste material shall be hauled in trucks with tight-fitting beds to prevent spilling on roadways. The construction site shall be kept neat, orderly, and safe for workmen at all times.

1.08 STORAGE AREA

A. Notwithstanding Contract Clause, FAR 52.236-10, Operation and Storage Areas, subject to approval by the Contracting Officer and in turn, availability and need, a storage area may be provided along the southwest perimeter road of _____ AFB.

B. At no additional cost to the Government, the contractor shall be required to erect a commercial grade six (6) foot high security fence comparable to existing fences in the area. Angle iron "temporary posts" giving an un-maintained rented appearance is unacceptable.

C. Storage areas are to be inspected weekly by the contractor and Government personnel. Trash and debris will not be allowed to accumulate and will be placed in the contractor's containers (dumpsters).

D. Vegetation shall not be allowed to exceed 3" in height. Grass and weeds along the fence line shall be eliminated by herbicide and cut at least five (5) feet outside the fence. Each contractor is responsible for his fence line. Common fence lines shall be maintained by each contractor.

E. Utility 'tie-ins' where available shall be the responsibili ty of the contractor

F. Upon completion of all work, the storage area will be cleaned and free of any materials, trash or debris prior to the release of final payment. Existing fencing shall remain the property of the Government.

G. Failure to comply with these requirements shall result in notification by the Contracting Officer to vacate the storage area within 72 hours, with no legal recourse for any additional cost by the contractor.

1.10 UTILITIES SERVICE:

A. The Government will provide a reasonable amount of utilities (electricity, gas and water) at the construction site.

B. All electrical power outages will be coordinated with the Contracting Officer or his representative. Notice will be provided by the Contractor to the Contracting Officer, in writing, not less than 10 working days prior to the required outage, and the Contractor shall receive written approval for the outage from the Contracting Officer.

C. All work shall be coordinated and arranged to ensure that the outage will be of minimum duration. In the event a scheduled power outage is canceled by the Government, notification shall be given to the Contractor at least 24 hours in advance of the time for the outage to start and the Contractor waives the right to any claim for equitable adjustment or increased costs of performance under this contract as a result of this cancellation.

D. Once an electrical outage is arranged and work begun, work must go on until electrical power is restored to the affected circuit(s) and/or facility.

E. Upon receipt by the Contracting Officer of a severe weather warning with anticipated winds of 35 knots or higher, the following sequence of actions will be carried out:

1. The Contracting Officer or his representative will notify the Contractor of the severe weather warning.

2. The Contracting Officer or his representative will instruct the Contractor to secure all materials and equipment.

3. The Contractor will take immediate action to tie down, remove, protect, or secure his materials and equipment to the satisfaction of the Air Force Inspector in order to reasonably assure that Government Property will not be damaged. If the Contractor fails or refuses to secure materials and equipment to the satisfaction of the Air Force Inspector, the work will be accomplished by Air Force personnel and the cost thereof charged to the Contractor.

1.11 EXISTING UTILITIES

A. Record drawings showing existing underground utilities are located at Building _____, _____ AFB. The contractor shall avail himself of the drawings. Any utility line shown on the record drawings (or made known to the Contractor) and damaged during construction work will be repaired immediately by the Contractor at no cost to the Government.

B. A properly approved and coordinated construction permit (AF Form 103) shall be obtained by the Contractor from _____ at XXX-XXXX for processing prior to excavation activities. Digging permit will be requested 5 working days prior to planned excavation.

1.12 EXISTING FACILITIES

A. The existing dimensions and locations shown on the applicable drawings are for approximation purposes only. Failure to verify the dimensions and locations will be at the contractor's risk and shall not relieve the contractor from accomplishing the work required by the contract at the contract amount awarded by the Government.

B. The contractor shall provide portable toilet facilities.

C. Asbestos containing materials shall not be used in construction work.

1.13 INSPECTION AND ACCEPTANCE

A. The contractor shall be subject to no-notice inspections under Occupational Safety and Health Act (OSHA) Program by inspectors of the Department of Labor.

B. Inspections and final acceptance will be made as the contractor completes all work covered by the contract.

C. The contractor shall make sure that the work is ready for all inspections. The presence of an unreasonable number of deficiencies or an incomplete major entity of work as determined by the Contracting Officers Representative will be cause for the inspection to be canceled.

D. Following completion of the pre-final/final inspections, a list of the noted deficiencies will be made available to the contractor.

1.14 BARRICADES AND WARNING SIGNS

Adequate barricades, and warning signs, shall be furnished, installed, and maintained by the Contractor. Barricades shall be Standard Type I, Standard Type II, alternate Type I, or alternate Type II as covered in Part V, Sections C and G, of the Texas Manual on Uniform Traffic Control Devices, Volume 1, Signs and Barricades, 1973, at the option of the Contractor, unless otherwise specified. Barricades shall have warning lights, Low-Intensity Electric Flashers, Type A, for night application

1.15 WATER CONSERVATION

The contractor will take proper precautions to ensure water is conserved to the maximum extent possible. In the event the host project air force base implements water usage restrictions, the contractor will be required to comply with the restrictions, at no additional cost to the Government. In the event the contractor cannot comply with the water usage restrictions and still meets other contract requirements, then the contractor can request permission from the Contracting Officer for relief from the restrictions. The contractor's request must be sufficiently detailed to support the appropriate manufacturer's/supplier's data to show why compliance is adverse to the construction, the extent of water usage beyond the restrictions and assurances that the minimum water usage necessary to comply with contract requirements.

1.16 OCCUPIED AREAS

A. The scope of work may include occupied areas. Arrangements will be made so that occupied areas may be blocked off during construction. The contractor shall notify the Contracting Officer of the intent to start a minimum of 48 hours prior to the time the work is to commence in the areas of concern. Contractor shall coordinate the work of all activities whereby both the Government and the contractor can continue operations with the least possible interference and inconvenience. Barricades and/or other safety devices shall be provided by the contractor for the safe access to and egress in the work area.

B. The contractor will be required to have a minimum of crews for work covered by this contract, and provide additional crew(s) as the work justifies. Each crew shall be capable of operating simultaneously and independently of the other crew(s).

1.17 SAFETY REQUIREMENTS

A. As a minimum, the contractor must be familiar and comply with general safety requirements IAW DOL regulations, OSHA 1926/1910, as well as applicable AFOSH standards and Air Force Regulations. These standards and AFR's are available in the 12 FTW Ground Safety Office.

B. Comply with all pertinent provisions of the Corps of Engineers' Manual EM 385-1-1, current edition, entitled "Safety and Health Requirements Manual".

STANDARD	SECTION	SUBJECT
1910	.132	Personal Protection Equipment

1910 (AFR 127-100)	.215	Explosives
1926	Subpart H	Material Handling
1926	Subpart O	Mechanized Equipment
1926	Subpart Q	Concrete Forms
1926	Subpart P	Trenching
1926	.202, .203	Barricades
1925	.461	Scaffolding
1926	.850	Demolition
AFOSH 161-4	N/A	Asbestos and PPE
AFOSH 127-4	N/A	Ladders
AFOSH 127-5	N/A	Welding, Cutting, Brazing
AFROSH 127-25	N/A	Confined Spaces

B. The contractor is responsible for supplying each employee with personal protective equipment. To include, but not limited to, protection for the face, eyes, head and extremities.

C. All personal protective equipment shall be of safe design and construction for the work to be performed.

D. All personnel are required to obey all speed/traffic laws, parking regulations and traffic control devices while on _____ Air Force Base. Failure to do so could result in the loss of on-base driving privileges and/or debarment from _____ Air Force Base. Contractor management will take appropriate action in the event an employee receives a citation. The action will be recorded in the appropriate block of the reverse side of the original citation.

E. Seat-belt usage is mandatory while driving on base (IAW AFR 127-7).

F. The speed limit on _____ Air Force Base is 25 miles per hour (MPH) unless otherwise posted. All housing areas are 15 MPH, service drives and parking lots are 5 MPH. Electronic detection devices are used for measuring speed. Employees are cautioned to obey all speed laws, parking regulations and traffic control devices. Failure to do so can result in the loss of driving privileges and debarment.

G. Privately owned contractor vehicles are prohibited from driving on the flightline, taxiways and aircraft parking areas, except when specific permission has been granted by Base Operations.

H. The contractor is required to notify Security Police, XXX-XXXX, in the event of a traffic accident. Inform the Security Police if an ambulance is required. In minor accidents, vehicles creating a traffic hazard may be moved off the roadway, away from the flow of oncoming traffic.

I. The contractor is responsible for reporting all accidents incidental to the contractor's operation to the Contracting Officer.

J. Accidents involving injuries to Air Force personnel or damage to Government property involving the contractor may be reportable United States Air Force mishaps and must be reported to the Contracting Officer and the Ground Safety Office at extension XXX-XXXX.

K. The contractor is responsible for ensuring all contractor employees have a safe and healthful workplace while performing work as stated in the contract.

1.18 SECURITY REQUIREMENTS

A. Vehicles owned by the contractor, with the company name printed on them, need not be registered. Personnel employed by the contractor must register their privately owned vehicles. Temporary vehicle passes will be issued for the period of the contract, not to exceed one (1) year. Personnel requesting base registration must have liability insurance, current license plates, valid driver's license, and current state inspection sticker. If the contract is to be performed other than during the normal duty hours, more than 180 days or within a

controlled area, the contractor will coordinate with the Contracting Officer to ensure employees obtain Civilian Identification Cards.

B. Random base entry/exit point checks are authorized by the Installation Commander. Refusal to submit to these checks will result in loss of on-base driving privileges and/or debarment from the host project air force base.

C. Should the contractor need to block or partially restrict normal flow of traffic, he will notify the Security Police a minimum of 24 hours prior to doing so. All barricades will be supplied by the contractor.

D. Illegal drugs and any type of weapons are prohibited. In the event personnel bring the above items onto the host project air force base, they can be prosecuted in Federal Magistrates Court.

1.19 INSURANCE REQUIREMENTS

The contractor shall procure and maintain during the entire period of the contract the following minimum insurance requirements.

1. *Workmen's Compensation Employers Liability:* As required by law except that and if this contract is to be performed in a state which does not require or permit private insurance the compliance with the statutory or administrative requirements in any such state will be satisfactory. The required Workmen's Compensation insurance shall extend to cover employer's liability for accidental bodily injury or death and for occupational disease with a minimum liability limit of $100,000.00.

2. *Comprehensive General Liability:* Minimum limits of $500,000.00 per occurrence for bodily injury. This insurance shall include contractors protective liability and contractual liability.

3. *Comprehensive Automobile Liability:* Minimum limits of $200,000.00 per person and $500,000.00 per occurrence for bodily injury and $20,000.00 per accident for property damage. This insurance shall extend to cover hired cars and automobile non-ownership liability.

1.20 PROJECT SIGN

A. The Contractor shall provide a project sign as shown on the contract drawings. This sign shall be in place no later than five (5) working days after the construction notice to proceed. The sign shall be visible from areas outside the construction fencing.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01010

SPECIAL CONDITIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, general and technical provisions of the contract and other Division 1 specification sections apply to the work of this contract.

1.02 DESCRIPTION OF WORK

A. The work covered by the drawings and specifications consists of providing material and labor to _____. Principal features: The work includes, but is not limited to the following:

1.

2.

3.

B. Provide all items, articles, materials and operations listed including all labor, equipment and incidentals required for satisfactory installation and completion of work.

1.03 APPLICABLE PUBLICATIONS

A. All referenced specifications, standards and publications form a part of this Specification. Reference includes any and all current (at bid opening) amendments, addenda and errata to basic publications.

1.04 NOTICE TO START

A. Notify Contracting Officer or authorized representative of proposed physical start date at least 7 days in advance.

1.05 COORDINATION

A. Contractor shall limit his use of the premises for work and for storage to area(s) set forth by the Contracting Officer.

B. Conduct work to create the least amount of interference with Government activities.

C. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

D. Move any stored products under the Contractor's control which interfere with operations of the Government or separate contractor.

E. Where indicated, the Contractor shall evaluate the construction schedules, anticipated lead times for the delivery of materials, acclimatization of materials, and other constraints and provide the necessary quantity of materials to the Contracting Officer to allow the Government to order material and equipment for installation by the Contractor. This shall be accomplished in submittal format for the associated specification section, in a timely manner, preferably within ten days after acknowledgment of Notice to Proceed. Quantity of materials is the Contractor's responsibility.

F. The Government shall receive and store materials in it's own facilities within a two mile radius of the project site. The Contractor shall pick up Government Furnished Materials (GFM) and transport them to the site for installation. Government storage facilities will be open between the hours of 7:30 AM and 3:00 PM, Monday through Friday, except holidays. Contact the Contracting Officer twenty four (24) hours prior to pick up of GFM.

1.06 TEMPORARY USAGE BY GOVERNMENT

A. Temporary or trial usage by Government of mechanical service, machinery, apparatus, equipment or any work or materials supplied under Contract before final acceptance shall not be construed as evidence of Government's acceptance of same.

B. Contractor remains responsible for damage during such usage due to weakness or failure of structural parts or due to defects of materials or workmanship.

1.07 VERIFICATION OF EXISTING CONDITIONS AND DIMENSIONS

A. The Contractor shall be responsible for the coordination and relation of the work to all trades. The Contractor shall familiarize himself with all details of the project, verify all existing conditions and dimensions and advise the Contracting Officer of any discrepancy before performing any work.

1.10 SUBMISSION OF PHOTOGRAPHS

A. Contractor *shall submit* to the Contracting Officer, *photographs* taken on or about the first of every month, showing the general conditions of the work and as necessary to portray the construction sequence as viewed from the north, south, east and west elevations. Photographs (one roll of 35mm color prints, minimum

of twenty (20) 3"X5" standard prints and negatives shall be developed and printed and submitted within 72 hours of the time they were taken). Field coordinate reference points for the consistent angle of photographs with the Government. They shall show, inasmuch as practicable, work accomplished during the previous month. Photographic quality and composition of photocopies shall be such that they can be used for briefings and/or to illustrate articles on the construction progress of the project.

1.11 GOVERNMENT FURNISHED MATERIALS

A. The Government will provide materials and equipment for the project as noted.

B. The Government will arrange and pay for delivery of Government furnished items in accordance with the Contractor's Construction Schedule, and will inspect deliveries for damage.

C. If Government furnished items are damaged, defective or missing, the Government will arrange for replacement. The Government will also arrange for manufacturer's field services, and the delivery of manufacturer's warranties and bonds to the Contracting Officer.

D. The Contractor is responsible for designating the delivery dates of Government furnished items in the Contractor's Construction Schedule and for transporting and handling Government furnished items at the site. The Contractor is responsible for protecting Government furnished items from damage, including damage from exposure to the elements, and to repair or replace items damaged as a result of his operations and installation.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01040

PROJECT COORDINATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

1.02 SUMMARY

A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

1. Coordination
2. General Installation Provisions
3. Cleaning and Protection

1.03 GENERAL REQUIREMENTS

A. Means and methods of construction are Contractor's responsibility unless expressly provided otherwise in Contract Documents.

B. Verify measurements and conditions at project site before beginning work.

1. The Contractor shall be responsible for the coordination and relation of the work to all trades. The Contractor shall familiarize himself with all details of the work, verify all conditions and dimensions and advise the Contracting Officer of any discrepancy until fully resolved.

C. Specification text which implies or requires specific responsibility for portions of the work is for the purpose of identifying "recognized expert" for that portion of the work.

1. Coordinate setting drawings, diagrams, templates, and instructions for installation by one trade of products supplied by another trade.

2. Coordinate delivery of such products for incorporation into the work in a timely manner.

D. Final responsibility for fulfillment of Contract Document requirements remains with the Contractor.

PART 2 PRODUCTS

2.01 GENERAL

A. Verify that equipment and materials supplied for project conform exactly to requirements of Contract Documents. Approval of a manufacturer's name by Contracting Officer does not relieve Contractor of responsibility described above.

B. Manufacturer's requirements for product installation shall govern work unless expressly specified or indicated otherwise.

C. Reference to manufacturer's specifications is to latest published standard for the product specified.

1. Equipment specifications are based on models and/or construction and installation methods prevailing at bid date.

2. Equipment installations requiring modification due to manufacturer's model and/or construction changes and other variations from items as specified shall be furnished and installed at no additional cost to the Government.

2.02 CONSERVATION:

A. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

2.03 COORDINATION DRAWINGS:

A. Prepare and submit coordination Drawings where any careful coordination is required for installation of products and materials fabricated offsite by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

B. Show the interrelationship of components shown on separate Shop Drawings.

1. Indicate required installation sequences.

2. Comply with requirements contained in Section 01300 "Submittals".

C. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

D. Where installation of one part of the work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

E. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

F. Make adequate provisions to accommodate items scheduled for later installation.

G. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

H. Prepare similar memoranda for the Government and separate Contractors where coordination of their work is required.

PART 2 PRODUCTS (Not Applicable).

PART 3 EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner .

B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

E. Visual Effects: Provide uniform joint width in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Government for final decision. Recheck measurements and dimensions, before starting each installation.

F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

G. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

H. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Government for final decision.

3.02 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining and corrosion.
16. Combustion.
17. Electrical current.
18. High speed operation.
19. Improper lubrication.
20. Unusual wear or other misuse.
21. Contact between incompatible materials.
22. Destructive testing.
23. Misalignment.
24. Excessive weathering.
25. Unprotected storage.
26. Improper shipping or handling.
27. Theft.
28. Vandalism.

END OF SECTION

SECTION 01095

REFERENCED STANDARDS AND DEFINITIONS

PART 1 GENERAL

1.01 DEFINITIONS

A. General Explanation: Certain terms used in Contract Documents are defined generally in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work.

B. General Requirements: Refers to the provisions or requirements of Division 1 sections. General Requirements apply to entire work of Contract.

C. Indicated: The term "indicated" is a cross- reference to details, notes, or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown", "noted", "scheduled", and "specified", are used in lieu of "indicated", it is for purpose of helping reader cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, etc: Where otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted", mean "directed by Contracting Officer", "requested by Contracting Officer", etc. However, no such implied meaning will be interpreted to extend Contracting Officer's responsibility into Contractor's areas of construction supervision.

E. Approve: Where used in conjunction with Contracting Officer's response to submittals, requests, applications, inquiries, reports, and claims by Contractor, the meaning of term "approved" will be held to limitations of Contracting Officer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Contracting Officer be interpreted as a release of Contractor from responsibilities to fulfill requirements of Contract Documents.

F. Furnish: The term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

G. Install: The term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, as applicable in each instance.

H. Provide: The term "provide" means furnish and install, complete and ready for intended use.

I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

J. The term "experienced", when used with the term "Installer", means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

K. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

L. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor. This requirement shall not be interpreted to conflict with enforcement of building codes and

similar regulations governing the work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

M. Minimum Quality/Quantity: In every instance, quality level or quantity specified is intended as minimum for the work to be performed or provided. Actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. Refer instances of uncertainty to Contracting Officer for decision before proceeding.

N. Abbreviations and Names: Where acronyms or abbreviations are used in specifications or other Contract Documents they are defined to mean the industry recognized name or trade association, standards generating organization, governing authority or other entity applicable to context of text provision. Refer to "Encyclopedia of Associations" published by Gale Research Co., available in large libraries.

O. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the drawings.

P. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

Q. Specification Content: This Specification used certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

R Abbreviated Language: Language used in Specifications and Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates. A method of organizing drawings and details, where specification section numbers are listed on the drawings for reference has been employed. These annotations declutter the drawings and remove descriptive information to the specifications. These annotations make reference to the section(s) but may also indicate specific components of the assembly specified in the section(s). The reference is intended to be all inclusive and represent the complete assembly.

1.02 DEFINITIONS - DRAWINGS

A. Similar: Used in its general sense and not meaning identical; all details should be worked out in relation to their location and connection to other parts of the work.

B. Typical: Used to indicate item of work shown or described in one location shall be included/performed in all similar locations unless specifically noted otherwise.

C. Abbreviated Drawings:

1. Where on any drawings a portion of work is drawn out and remainder is indicated on the outline, the drawn out part shall apply also to other like portions of work.

2. Where ornament or other detail is shown by starting only, such details shall also apply to all other similar parts in work unless otherwise indicated.

D. Dimensions: Actual dimensions on drawings or notes shall be used instead of measurement of drawings by scale. Dimensions on all drawings are subject to verification of measurements of adjacent or incorporated work.

1.03 GOVERNING REGULATIONS/AUTHORITIES

A. Comply with all applicable laws, statutes, regulations, and ordinances of Federal, State, County, and City governments.

B. Obtain and pay for all permits, fees, and licenses required by Law.

C. Submit copies of all permits, licenses, and certificates to Government showing compliance with applicable standards and regulations.

F. Fire Protection Construction Criteria: The Contractor will be required to comply with all pertinent provisions of NFPA No. 241 entitled, "Building Construction and Demolition Operations", including Appendix A.

G. The Contractor shall comply with applicable installation construction regulations during the construction period. The Contractor shall furnish and maintain fire extinguishers required during the construction period and shall remove the extinguisher(s) when construction is completed.

1.04 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

E. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A This Section specifies administrative and procedural requirements for project meetings including but not limited to:

1. Pre-Construction Conferences
2. Coordination Meetings
3. Progress Meetings.

B. Government attendance is for information only and as such, attendance by the Government at these meetings is at their discretion. Distribution of meeting minutes shall include the Government.

1.03 PRE-CONSTRUCTION CONFERENCES

A. Conduct a pre-construction conference at the site before each construction activity that requires coordination with other construction. The Contractor and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Government of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-construction conference, including requirements for:

Contract Documents.
Purchases.
Deliveries.
Shop Drawings, Product Data and quality control Samples.
Possible conflicts.
Compatibility problems
Time schedules.
Weather limitations.
Manufacturer's recommendations.
Compatibility of materials.
Acceptability of substrates.
Temporary facilities.
Space and access limitations.
Governing regulations.
Safety.
Inspection and testing requirements.
Required performance results.
Recording requirements.
Protection.

2. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Government.

3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.

1.04 COORDINATION MEETINGS

A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre- installation meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.05 PROGRESS MEETINGS

A. Conduct progress meetings at the Project site at regularly scheduled intervals. Notify the Government of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: In addition to representatives of the Government each sub-contractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

D. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

E. Review the present and future needs of each entity present, including such items as:

1. Interface requirements.
2. Time.
3. Sequences.
4. Deliveries.
5. Off-site fabrication problems.
6. Access.
7. Site utilization.
8. Temporary facilities and services.
9. Hours of Work.
10. Hazards and risks.
11. Housekeeping.
12. Quality and Work standards.

F. Reporting: No later than three (3) days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

G. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, general provisions of the contract and other Division 1 specification sections apply to the work of this section.

1.02 DESCRIPTION OF WORK

A. All labor, materials, equipment, and services necessary to provide submittals as indicated or specified herein.

1.03 DEFINITIONS

A. Shop drawings include specially prepared technical data for this project, including drawings, diagrams, schedules, measurements, and similar information not in standard printed form for general application to a range of similar projects.

B. Product data includes all standard printed information on materials, products and systems.

C. Samples include physical examples of materials, either for limited visual inspection or (where indicated) for more detailed testing and analysis.

D. Miscellaneous submittals related directly to the work include warranties, maintenance agreements, workmanship bonds, data and reports, physical work records, quality testing and certifying reports, record drawings, field measurement data, operating and maintenance materials applicable to the work and not processed as shop drawings, product data or samples.

1.04 SUBMITTAL REQUIREMENTS

A. General: Except as otherwise indicated in individual work sections, comply with requirements specified herein for each indicated category of submittal, and with the requirements of each technical specification section. Except as specified samples shall become property of the Government.

B. *Within ten days after acknowledgment of Notice to Proceed* and before any material or equipment is purchased, submit for approval five copies of quality assurance data, shop drawings, manufacturer's product data, catalog cuts, descriptive data, samples and other information at one time except as noted. Where action on one submittal is dependent

on another it shall be submitted in compliance with action taken on another, the action may be more rapid if they are received at the same time. The Government will review submittals in a timely manner. Samples shall be submitted in compliance with contract documents and are the responsibility of the Contractor. The Contractor or his Authorized Representative shall certify by his signature and a date that each submittal is correct and in strict conformance with contract drawings and specifications except as otherwise stated. All proposed deviations requested by the Contractor shall be noted and the reasons for the deviation set down in writing and the deviations annotated on the shop drawings or materials will be returned to the Contractor for correction.

1.05 GOVERNMENT ACTION

A. The Government will annotate each submittal to indicate the action taken: Final Unrestricted Release: Where submittals are marked "Approved", that part of the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

B. Final But Restricted Release: When submittals are marked "Approved as Noted", that part of the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

C. Returned for Resubmittal: When submittal is marked "Disapproved" do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action. Do not permit submittal marked "Disapproved" to be used at the Project site, or elsewhere where work is in progress.

D. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required".

1.06 PROJECT RECORD DOCUMENTS

A. Job Set: Maintain a complete set of Contract Documents (Drawings and Project Manual) in good condition. Mark actual installations as the work progresses which vary substantially from the work originally shown. Include change order numbers where applicable.

B. Review: Make record drawings available for review during construction period at Contracting Officer's request. Submit to Contracting Office for review.

C. Reproducible Set: Provide to Government an updated reverse sepia reproducible set of all Contract Drawings based on reviewed set of record drawings.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

PART 4 SCHEDULES

4.01 SUBMITTAL SCHEDULE

A.The contractor shall provide a submittal register.. This register does not relieve the Contractor from complying with all specification requirements. Additional items which may be required for proper execution of work shall be submitted as directed by the Contracting Officer to provide a cross reference between the specifications and Contractor provided submittals, the Contractor shall develop and record submittals on a register. At a minimum, the register shall include: specification and paragraph number; description of submittal; type of submittal; i.e. shop drawings, samples, manufacturer's data, certificate, test report, guaranteed warranty, other as noted; and date submitted. Utilize 8 1/2 X 11 format with title and location, Contractor, contract number, and page numbers. Register shall be submitted after Notice to Proceed but prior to the Government receipting any others required by the Contract.

END OF SECTION

SECTION 01410

QUALITY CONTROL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, general provisions of the contract, and other Division-1 specification sections apply to the work of this section.

1.02 DESCRIPTION OF WORK

A. All labor, materials, equipment and services necessary to accomplish the work of this section as indicated or specified herein.

B. Quality Control shall be extensively provided for, but not limited to:

1. Section _____;
2. Section _____;
3. Section _____;
4. Section _____;

C. Quality Control shall be provided for the entire project. Responsibility for accomplishing Quality Control is the Contractor's. Specific Quality Control requirements are as listed herein.

D. The contractor shall provide a full time Quality Control function to assure himself and the Government that all materials and workmanship are in strict accordance with the provisions of the drawings and specifications. Upon notification of award, the contractor shall submit his/her quality control plan for review and approval. The plan if approved, shall remain in effect for the life term of the contract.

E. Quality Control Plan Requirements:

1. The quality control plan shall detail the procedures, instructions and reports to be used to assure compliance with the contract.

2. Appointment letter: A copy of the letter appointing the Quality Control Representative, (project superintendent) signed by an officer of the firm and outline the Representative's duties, responsibilities, and authority. This letter must include the authority to direct removal and replacement of any defective work.

3. Qualifications: Information on the QC representative submitted should be pertinent and specific to include professional qualifications, experience level, and past projects.

4. Listing of Outside Organizations: A listing of outside organizations such as subcontractors, suppliers, consultants, etc.

1.03 INSPECTION SERVICES

A. Accomplish work in an orderly progression of steps to satisfy performance requirements of this Specification.

B. Items of work to be concealed shall be Government inspected prior to concealment.

C. Notify Contracting Officer at least five working days prior to proposed date of final inspection. Final inspection shall be preceded by a prefinal inspection (multiple inspections if necessary) at which time a list of deficiencies will be furnished to the Contractor. Discrepancies noted in the prefinal inspection(s) shall be corrected by the Contractor and reinspected by the Government prior to final inspection of the work.

D. Provide manufacturer's inspection as outlined in specific "Products" sections.

1.04 QUALITY ASSURANCE (QA)

A. Manufacturer: Obtain materials of each type required from a single manufacturer, to greatest extent possible. Provide secondary materials only as recommended by manufacturer of primary materials.

B. Contractor: Firm(s) with not less than 3 years of successful experience in installation of _____ and other components similar to requirements for this project and which is acceptable to manufacturer of associated materials.

C. As specified herein, provide the QA evidence needed to establish confidence that quality control (QC) is being performed adequately.

D. Except as modified and supplemented herein, follow the published requirements and written recommendations of the materials manufacturers. Concerning methods of installation, industry practices apply only when this Contract does not address the matter.

E. The specified QA requirements are minimums; provide additional QC, if in the opinion of the Contracting Officer, the QA is not effective enough to provide conforming work. This additional QA does not constitute a change to the contract. Also, do what is needed to fulfill the intent and requirements of FAR 52.246-12, Inspection of Construction.

F. The QC is subject to audit by a Government inspector and may be subject to audit by a Government-designated consultant. Give the inspector and the consultant all information necessary for this audit.

1. The Government is not obligated to inspect a Contractor's work or to protect a contractor from the consequences of such work. Government inspection is a general examination of the Contractor's conduct and work, and is solely for the purposes of the Government. Government inspectors do not have the authority to accept any work, whether or not it is conforming. Government inspection is not to be construed as conclusive. Information that may be offered to the Contractor does not change the Contract.

2. Government agents, including inspectors, engineers, and quality assurance evaluators, are not authorized to change the Contract without the written authorization of the Contracting Officer; this lack of authority extends to all situations in which the actions of these agents could be construed as constituting a change.

G. Provide Quality Control defined as follows:

1. Quality Control is the regulatory process by which the Contractor measures actual quality performance, compares it with standards, and acts on the difference. The quality function is the entire collection of activities through which fitness for use is achieved.

2. Contractor inspection is a careful and critical investigation of all work to assure that it conforms to the Contract, and to detect variances and act to correct them in time to prevent reworking and delay. This includes detailed, skillful examination and testing with immediate comparison to the requirements of the Contract. On discovery of variance the Contractor will immediately institute corrective action to eliminate the variance and to insure that all future work conforms to the requirements of the Contract.

3. Hire or appoint a representative whose sole duty is to act as fulltime quality controller. The quality controller is to be a registered construction journeyman or person with at least 5 years experience in the supervision and inspection of this type of construction. The QC shall not be the job superintendent or foreman.

4. Basic Quality Control Requirements appear in paragraph 1.05 of this section. As a minimum, the quality controller shall perform each of the actions listed on a daily basis. Failure to perform these actions is a failure to prosecute the work with such diligence that will insure its completion within the time specified

in this contract or any extension thereof within the meaning of the clause entitled "Termination for Default-Damages for Delay-Time Extensions" and the Government will be entitled to terminate the contractor for default.

1.05 BASIC QUALITY CONTROL REQUIREMENTS

A. Introduction:

1. The quality controller shall ensure that the Government obtains products and services as required by the contract.

2. To accomplish this, the quality controller shall continuously observe work in progress, including testing and measuring, and report findings on a daily record form. The Government is assured of "getting exactly what is required" when the record form does not contain any variances from the contract. Included is a statement of appointment of quality controller.

B. Before actual work begins, the Quality Controller shall:

1. Read the specifications and study the drawings.
2. Understand AF Form 1063, Quality Control Record, and reporting procedures.
3. Visit the site and become familiar with its layout.
4. Attend the preconstruction conference.

C. Quality Control Record: Complete AF Form 1063, daily as follows:

1. Top Section:

a. Insert date and record no.
b. Insert weather description and temperature.
c. Indicate crew start and stop times.
d. Indicate your start and stop times.
e. Indicate roof area by grid lines and dimensions.
f. Indicate area previously completed by grid lines and dimensions.

2. Products Section. This section is divided into major categories. Each category may include several materials:

a. Examine each material within the category and check the proper box.

b. Check the "Not Applicable" box for materials not included in work.

c. Assure that all materials in a category comply with the contract to result in a check in the "Complies" box. To determine compliance, compare the material with the project specifications and drawings, and also with the approved manufacturer's literature submitted. Since materials other than those covered by the components listed may be used, enter their compliance in the blanks provided and the "All Other Materials" category.

3. Execution Section:

a. The work item numbers in this section of the record correspond to the work items in these Basic QC Requirements. The work items are specification items considered to be of major concern. These items are in the Basic QC Requirements for convenience and tabulation.

b. Performance of the "actions" below the work item will result in an entry in the proper box on the QC record. Specification items not in the Basic QC Requirements must also be considered, and their acceptability grouped and documented in the "Other" box.

4. Variance Section:

a. An entry in any "Varies" box under the "Products" or "Execution" Sections requires an explanation of the variance in this section. The explanation should be limited to a description of the variance only; reasons for variance are not necessary.

b. Indicate action taken to resolve each variance to result in complying work. Certain actions resulting from variances from some of the specification requirements are included with the specified

requirement. If a variance is not resolved on the same day it occurs, the number of that day's record must be entered in the space provided on records for all succeeding days, until the variance is resolved.

5. Closing Section: Sign the record at the end of the workday and submit it to the Government inspector the same day.

6. The Government will supply the Contractor with AF Forms 1063 at the preconstruction conference.

D. WORK ITEMS (Corresponds to Work Item under Execution on AF Form 1063). In the course of construction, the Government may include additional work items, to be included on the AF Form 1063.

WORK ITEM 1.

WORK ITEM 2.

WORK ITEM 3.

WORK ITEM 4.

WORK ITEM 5.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample taking and similar services performed on the work, repair damaged work and restore substrate and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed finishes. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, general provisions of the contract and other Division 1 Specification Sections apply to the work of this section.

1.02 DESCRIPTION OF WORK

A. Provide all labor, materials, equipment and services necessary to perform the work of this section as indicated or specified herein.

1.03 QUALITY ASSURANCE

A. Comply with Federal, State and local codes and regulations and with the host air force base utility requirements.

1.04 JOB CONDITIONS

A. Maintain in good condition throughout the job all temporary and existing utilities required for construction.

B. Terminate use and remove temporary utilities at earliest reasonable time when no longer needed or when permanent utilities have, with authorized use, replaced the need.

1.05 TEMPORARY ELECTRICITY AND LIGHTING

A. Provide connections to existing facilities, size to provide service required for power and lighting; Government will pay the costs of power used.

B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available throughout the construction site by the use of construction-type power cords.

C. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work and for areas accessible to the public.

D. Permanent electrical service installed under this contract may be used during construction period.

1.06 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to the temperature or humidity.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulation of duct, fumes, vapors or gases.

C. Portable heaters shall be standard approved units complete with controls, of a type which will not smoke or otherwise damage building finishes. Pay all costs of installation, maintenance, operation, and removal.

D. Provide connections to existing facilities, extend and supplement with temporary units as required to comply with requirements. Pay all costs of installation, maintenance, operation and removal. Government will pay costs of fuel used from the existing system.

1.07 TEMPORARY WATER

A. Make connections to existing facilities to provide water for construction purposes. Government will supply water at no cost to the Contractor.

1.08 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations. Service, clean, and maintain facilities and enclosures.

1.09 GUARDRAILS AND BARRICADES

A. Furnish, post, maintain, and remove guardrails, barricades and construction warning signs insufficient number and at appropriate locations to protect and safeguard base personnel, property and operations during construction.

1.10 ACCESS TO SITE

A. Use only prior approved routes to and from storage, work, and disposal areas. Confine all operations and maintenance of tools and equipment, parking of vehicles, and storage of items.

B. General Area Requirements: All security requirements and procedures shall be coordinated with the host project air force base Security Police Squadron. All activities of the Contractor and his employees and subcontractors and their employees while on the base shall be conducted in strict accordance with all base regulations, including those of the fire marshall as well as security directives.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 GENERAL

A. Comply with applicable requirements specified in Division _____.

B. Maintain and operate systems to assure continuous service.

C. Modify and extend systems as work progress requires.

3.02 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Clean and repair damage caused by temporary installations or use of temporary facilities.

C. Restore existing facilities used for temporary services to specified, or to original condition.

D. Restore permanent facilities used for temporary services to specified, or to original condition.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, general provisions of the contract and other Division 1 Specifications Sections apply to the work of this section.

1.02 DESCRIPTION OF WORK

A. Provide all labor, materials, equipment and services necessary to perform the work of this section as indicated or specified herein.

1.03 QUALITY ASSURANCE

A. To the greatest extent possible for each unit of work, provide products, materials, or equipment of a single generic type from a single source.

B. Reference Standards: References to standards from industry, government or other organizations shall mean latest edition published or adopted at date of receipt of bids, and shall apply as fully as if printed in full herein. Reference includes current (at bid opening) amendments, addenda, and errata to basic publications.

1.04 TRANSPORTATION AND HANDLING

A. Properly identify all materials shipped to the Contractor in care of the host project air force base with the Contractor's name, the project title and number and the specific delivery point on base. Receipt of materials is the Contractor's responsibility.

B. Deliver product bearing manufacturer's name and brand with labels intact and seals unbroken. Deliver in original undamaged containers where packaged for delivery by manufacturer. Follow manufacturer's directions for handling.

C. Deliver products bearing testing agency label and classification where fire or other rating is required.

D. Avoid blocking traffic or access to adjacent streets or structures with delivery vehicles.

E. Do not deliver any products, materials, or equipment until adequate storage is available to prevent damage to the item.

1.05 STORAGE FACILITIES

A. No covered storage area is available for the Contractor's use; however, the Government will supply an open storage area. The Contractor may, at no additional expense to the Government, provide a temporary structure in the designated area. Remove structure upon completion of this Contract.

B. Store all items in accordance with manufacturer's recommendations and by means and methods which will prevent damage, deterioration, and theft.

C. Minimize long-term storage on site.

D. Satisfactorily repair or remove and replace installed work damaged during construction period.

E. Do not overload floor/roof systems with stored materials.

F. Contractor shall confine operations and storage to areas indicated on the drawings and as directed by the Contracting Officer. Carry on work so not to encumber adjacent roads and so as to cause a minimum interference with normal functions of surrounding area.

1.06 CLEANING

A. Maintain and clean work and storage areas on a daily basis. Materials removed and not reused and debris resulting from the Contractor's work shall become the property of the Contractor. The sale of any materials and debris on the host project air force base is prohibited. Remove all materials and debris that become the Contractor's property and legally dispose of off Government property at no additional charge to the Government.

1.07 SUBSTITUTIONS AND PRODUCT OPTIONS

A. Manufacturer's catalog numbers or product lines in this Specification are indicative of the general type and quality of materials and equipment desired and are not intended to limit or restrict selection of any particular manufacturer. Materials and equipment of similar design, equivalent characteristics, and quality will be acceptable if submitted to and approved by the Contracting Officer. Submittals for approval of substitute materials shall contain sufficient information, descriptive brochures, drawings, samples, and other data necessary to provide direct comparison to specified material. It is the sole responsibility of the Contractor to submit complete descriptive and technical information to allow the Contracting Officer to make proper appraisal. A Contractor offering a substitution shall accept responsibility for its effect on the work of all trades including any interferences with other items and possible delays in the completion time of the project.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 INSPECTION SERVICES

A. Accomplish work in an orderly progression of steps to satisfy performance requirements of the specification. Repeat steps or phase disapproved by the Government at no additional cost to the Government until approval is obtained.

B. Items of work to be concealed shall be Government inspected prior to concealment.

C. Notify the Contracting Officer at least five working days prior to pro-posed date of final inspection. Final inspection shall be preceded by a prefinal inspection (multiple inspections if necessary) at which time a list of deficiencies in work will be furnished to the Contractor. Discrepancies noted in the prefinal inspection(s) shall be corrected by the Contractor and reinspected by the Government prior to final inspection of work.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 OPERATING AND MAINTENANCE DATA

A. General: Provide operating and maintenance instructions manuals and training as required herein. Submit one copy of manuals for approval prior to final copies. Preliminary and final copies shall be organized as follows:

1. 8.5" x 11" format or drawings accordion folded to this size.
2. Complete index of contents.
3. Dividers with indexed tables.
4. Final copies to have the title of project and names of Government and Contractor permanently imprinted or silk screened on the cover.

B. Manuals: Provide five (5) looseleaf binders containing one clean copy each of all applicable operating and maintenance data as described below:

1. Name, address, and telephone number of nearest manufacturer's representative.
2. Operating instructions (for equipment).
3. Maintenance instructions including type and frequency of cleaning, Repair data including drawings, diagrams, catalog cuts and parts lists.
4. Manufacturer's warranty or guarantee forms.

C. Training of Government's Personnel: Demonstrate and instruct Government's personnel through one complete cycle of operations and maintenance including start- up, shut-down, emergency operations, noise and vibration adjustments, safety, efficiency adjustments, and other relevant tasks.

3.02 FINAL CLEANING

A. General: Leave entire project site clean and ready for occupancy. Follow all manufacturer's recommendations for products and methods of cleaning. Additional special cleaning requirements for specific items of work are specified in the appropriate sections.

B. Remove labels which are not required as permanent labels.

C. Clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances which are noticeable as vision-obscuring materials.

D. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Avoid disturbances of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective conditions.

E. Wipe surfaces of mechanical and electrical equipment clean, remove excess lubrication and other substances.

F. Clean concrete floors broom clean.

G. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broomclean condition; remove stains, petro-chemical spills and other foreign deposits. Rake ground which is neither planted nor paved, to a smooth, even- textured surface.

H. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on _____ Air Force Base's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

END OF SECTION

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.01 SUMMARY:

A. Section includes all necessary demolition and the removal of waste resulting from demolition, including, but not limited to the areas listed in this section.

1.02 SITE DEMOLITION

A. Remove pavement and structures if applicable as shown on the drawings.

B. Remove existing plant material if applicable as shown on the drawings.

1. Before starting demolition work, plant material to remain shall be protected adjacent to demolition areas.

1.03 SALVAGE OF MATERIALS

A. Unless otherwise noted, all materials and structures removed or demolished under this contract shall become the property of the Contractor and shall be removed from the Government's property by the Contractor at no additional expense to the Government.

1.04 PROTECTION

A. The Contractor is responsible for providing all necessary protection to persons and the Government's property while executing the work under this Section. Provide and maintain required guard lights, barricades, shoring and bracing and any other protection required to comply with Federal, state, local and _____ Air Force Base codes and the contract specifications.

1.05 BURNING AND EXPLOSIVES:

A. Burning on-site is not permitted.

B. The use of explosive is not permitted.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 GENERAL

A. Within the areas of construction and elsewhere as indicated, remove in their entirety all specified items.

3.02 REMOVAL OF DEBRIS AND CLEANING:

A. Debris resulting from demolition shall be removed from the site daily and disposed of off the Owner's property.

B. Clean site of debris daily. At the completion of demolition, clean site by raking areas of demolition to remove any remaining debris.

END OF SECTION

SECTION 02224

EXCAVATION, TRENCHING, AND BACKFILLING FOR IRRIGATION SYSTEMS

PART 1 GENERAL

1.01 Applicable Publications: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. Military Standards (Mil. Std.):

MIL-STD-619B
Unified Soil Classification System for Roads, Airfields, Embankments, and Foundations
MIL-STD-621A & Notices 1 & 2 Test Method for Pavement Subgrade, Subbase, and Base-Course Materials

B. American Society of Testing and Materials (ASTM) Publications:

E 548-79 Generic Criteria for Use in the Evaluation of Testing and Inspection Agencies

1.02 DEFINITIONS:

A. Satisfactory Materials: Shall consist of any material classified by MIL-STD-619 as GW, GP, and SW .

B. Unsatisfactory Materials: Shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include, but are not limited to, those materials containing roots and other organic matter, trash, debris, frozen materials and stones larger than 2 inches, and materials classified in MIL-STD-619, as PT, OH, and OL. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction.

C. Cohesionless and Cohesive Materials: Cohensionless materials shall include materials classified in MIL-STD-619 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

D. Rock: Shall consist of boulders measuring 1/2 cubic yard or more and materials that cannot be removed without systematic drilling and blasting such as rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits, and below-ground concrete or masonry structures, exceeding 1/2 cubic yard in volume, except that pavements will not be considered as rock.

E. Unyielding Material: Shall consist of rock and gravelly soils with stones greater than three (3) inches in dimension or as defined by the pipe manufacturer, whichever is smaller.

F. Unstable Material: Shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenance structure.

G. Select Granular Material: Shall consist of well-graded sand, gravel, crushed gravel, crushed stone, or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve, and no less than 95 percent by weight passing the 1-inch sieve. The maximum allowable aggregate size shall be two (2) inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

H. Degree of Compaction: Shall be expressed as a percentage of the maximum density obtained by the test procedure presented in MIL-STD-621, Method 100, compaction effort designation CE 55.

I. Plastic Marking Tape: Shall be acid and alkali-resistant polyethylene film, six (6) inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to three (3) feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities, specifically, irrigation systems. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape

color shall be blue and bear a continuous printed inscription describing it as an “Irrigation line”. Warning tape shall be installed directly above the pipe and wiring where wiring is not associated with piping, at a depth of six (6) inches below finished grade.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 EXCAVATION

A. Excavation of every description and of whatever substances encountered shall be performed to the lines and grades indicated. Rock excavation shall include removal and disposition of material defined as rock in Section 1.02, Definitions, of this section. Earth excavation shall include removal and disposal of material not classified as rock excavation. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench sufficient to avoid overloading and to prevent slides or cave-ins. Adequate drainage shall be provided for the stockpiles and surrounding areas by means of ditches, dikes, or other approved methods. The stockpiles shall also be protected from contamination with unsatisfactory excavated material or other material that may destroy the quality and fitness of the suitable stockpiled material. If the Contractor fails to protect the stockpiles and any material becomes unsatisfactory as a result, such material, if directed, shall be removed and replaced with satisfactory on-site or imported materials from approved sources at no additional cost to the Government. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained. Unauthorized over-excavation shall be backfilled in accordance with Section 3.06, Backfilling, in this section, at no additional cost to the Government.

3.02 TRENCH EXCAVATION

A. The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below and above the top of the pipe shall be sloped, or made vertical, as recommended in the manufacturer's installation manual. The trench width below the top of the pipe shall not exceed that recommended in the installation manual. Where no manufacturer's installation manuals are available, trench walls below the top of the pipe shall be vertical, and trench walls above the top of the pipe shall be sloped as required to properly complete the work. Trench width below the top of the pipe shall not exceed 24 inches plus pipe outside diameter (OD).

3.03 BOTTOM PREPARATION

A. The bottom of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of two (2) inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.04 REMOVAL OF UNYIELDING MATERIAL

A. Where over-depth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed four (4) inches below the required grade and replaced with suitable materials as provided in Section 3.06, Backfilling, in this section.

3.05 REMOVAL OF UNSTABLE MATERIAL

A. Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in Section 3.06, Backfilling, in this section. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.06 BACKFILLING:

A. Backfill material shall consist of satisfactory material.

B. Trench Backfill: Trenches shall be backfilled to grade. The trench shall not be backfilled until all specified tests are performed. See Section 02810, 2811, or 2812 for further information.

C. Replacement of Unyielding Material: Unyielding material removed from the bottom of the trench shall be replaced with satisfactory material.

D. Replacement of Unstable Material: Unstable material removal from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding six (6) inches loose thickness.

E. Bedding and Initial Backfill: Bedding shall be of the type and thickness recommended by the pipe manufacturer. Maximum stone size shall not exceed two (2) inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller. Initial backfill material shall be placed in layers of a maximum of six (6) inches loose thickness and compacted with approved tampers to the density of the adjacent soil, and to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Backfill material in this portion of the trench shall consist of satisfactory material at a moisture content that will facilitate compaction, free from stones of such size as recommended by the pipe manufacturer, or larger than two (2) inches in any dimension, whichever is smaller, except that where the pipe is coated or wrapped for protection against corrosion, the backfill material shall be free of stones larger than one (1) inch in any dimension, or as recommended by the pipe manufacturer, whichever is smaller.

F. Final Backfill: The remainder of the trench shall be backfilled with satisfactory material. Backfill material shall be deposited and compacted as follows:

G. Sidewalks, Sodded or Seeded Areas, Open, and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of twelve (12) inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

H. Testing: The number of density tests required, if any, will be as called for on the plans, and location as determined by the Contracting Officer.

END OF SECTION

SECTION 02623

CONCRETE WORK FOR WALKWAYS

PART 1 GENERAL

1.01 Full cooperation shall be given other trades to install embedded items. Before placing concrete, embedded items shall have been inspected, and tests for concrete and other materials or for mechanical operations shall have been completed and approved by the Contracting Officer.

1.02 SUBMITTALS

A. Certificates of Compliance: Certificates of compliance and laboratory test reports for reinforcement, premolded joint filler, aggregate, admixtures, cement, and curing compound shall be furnished in accordance with Section 01000.

1.03 STORAGE OF MATERIALS

A. Cement shall be stored in weathertight buildings, bins or silos which will exclude moisture and contaminants. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Reinforcing bars and accessories shall be stored above the ground on platforms, skids, or other supports. Other materials shall be stored in such a manner as to avoid contamination and deterioration.

PART 2 PRODUCTS

2.01 ADMIXTURES

A Air-entraining admixture shall conform to ASTM C 260. 4.012 Aggregates: Aggregates for normal weight concrete shall conform to ASTM C 33. Maximum nominal aggregate size shall be 1-1/2 inches.

2.02 CEMENTING MATERIALS

A. Only one source and type of cement shall be used for concrete.

B. Portland cement shall conform to ASTM C 150, Type I or II.

C. High-early-strength Portland cement shall conform to ASTM C 150, Type III.

2.03 CEMENT

A. Cement shall be sampled either at the mill or concrete plant. Cement that has been stored, other than in bins at the mills, for more than 2 months after being tested shall be retested before use. Such cement and any other cement found by test to be unsuitable shall be removed from the mixing site.

B. Fly ash shall conform to ASTM 618-84.

2.04 CURING MATERIALS

A. Impervious sheet materials shall conform to ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.

B. Burlap shall conform to Fed. Spec. CCC-C-467.

C. Membrane-forming curing compound shall conform to ASTM C 309.

D. Joint Filler Strips: Expansion-joint filler, premolded shall conform to ASTM D 1751 or ASTM D 1752, 3/8 inch thick, unless otherwise indicated.

2.05 WATER

A. Water shall be potable, except that non-potable water may be used if it produces mortar cubes having 7- and 28-day strengths at least 90 percent of the strength of similar specimens made with water from a principal supply, prepared and tested in accordance with ASTM C 109. Water for curing shall not contain any substance injurious to concrete, or which causes staining.

2.06 CONCRETE STRENGTH AND USAGE

A. Strength Requirements: Concrete for walkways shall have a compressive strength equal to 3000 psi at 28 days.

B. High-Early-Strength: Concrete made with high-early strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete made with Type III Portland cement.

2.07 PROPORTIONING OR NORMAL WEIGHT CONCRETE MIXES

A. A maximum of 15 percent by weight of the cement may be replaced with fly ash. Mixes shall be proportioned by weight, (minimum cement factor 487 lbs/CY) although water and admixtures may be batched by volume if desired. Trial mixes and testing to meet requirements of the strengths of concrete specified shall be the responsibility of the Contractor. The design mix shall contain materials representative of those proposed for use in the work.

B. Admixtures: Entrained air in the range of 4 to 6 percent is required, determined in accordance with ASTM C 231. Water reducing or retarding admixtures may be used on written approval; however, no reduction in cement content will be permitted. Admixtures which have been in storage for longer than 6 months shall not be used until proven by retesting to be satisfactory, and approved by the Contracting Officer.

C. Slump: Slump shall be determined in accordance with ASTM C 143, and shall not exceed 4 inches.

2.08 SAMPLING AND TESTING

A. Tests on Fresh Concrete: Tests for slump shall be made on concrete sampled at the project.

B. Concrete Strength Tests:

C. Frequency of Testing: The Contractor shall, through the use of an approved testing laboratory, provide compression tests made in accordance with the American Society for Testing Materials Standard Specification C31-38. Four standard 6 inches diameter by 12 inches cylinders shall be made at the start of each day of concreting, one of which is to be tested at seven days and one at 28 days. The seven-day test will not be basis for acceptance or rejection.

D. Testing Procedures: The samples for strength tests shall be taken and tested in accordance with ASTM C 172 and ASTM C 39.

E. Evaluation of Results: Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of strength tests results equal or exceed the specified strength and no individual strength test result falls below the required strength by more than 500 psi. If any of these requirements are not met, steps shall be taken immediately to raise the strength level.

F. Strength Tests and Submittals: Strength tests of field cured specimens shall be made to check the adequacy of curing and protection of concrete in the structure, following the procedures in Section 7.4 of ASTM C 31. Results for slump and compression tests shall be submitted in accordance with Section 01000.

2.09 FORM WORK

A. Form work shall be designed and constructed so as to ensure that the finished concrete members will conform accurately to the indicated dimensions, lines, and elevations.

B. Form Coating: Forms, if used, other than retained-in-place metal forms, shall be coated with form oil or form-release agent before reinforcement is placed. The coatings shall be a commercial formulation of satisfactory and proven performance that will not bond with, stain or adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compound. Forms for unexposed surfaces may be wet with water in lieu of oiling, immediately before placing concrete, except that in cold weather with probable freezing temperatures oiling shall be mandatory. Surplus oil on form surfaces, reinforcing steel, and construction joints shall be removed before placing concrete.

C. Removal of Forms: Forms shall be removed in a manner that will prevent injury to the concrete.

PART 3 EXECUTION

3.01 PREPARATIONS FOR PLACING CONCRETE

A. General: Water shall be removed from the excavation before placing concrete. Hardened concrete debris, and foreign material shall be removed from the interior of forms if used. Runways shall be provided for wheeled concrete-handling equipment; such equipment shall not be wheeled over reinforcement nor shall runways be supported on reinforcement. Reinforcement and embedded items shall be inspected, and forms shall be retightened and checked, before placing concrete.

B. Concrete on Earth: Earth foundations shall be prepared as specified. Steps shall be taken not disturb the prepared foundation. Surfaces shall be clean and free from mud. The earth foundation shall be moistened prior to placement of concrete.

C. Batching, Mixing and Transporting Concrete: Concrete shall be batched, mixed and transported in accordance with ASTM C 94, except as otherwise specified. Truck mixers, agitators, and non-agitating units shall comply with TMMB "Truck Mixer and Agitators Standards". Plant equipment and facilities shall conform to NRMCA "Certification of Ready Mixed Concrete Production Facilities".

D. Admixtures: Admixtures shall be batched within an accuracy of 3 percent. Where two or more admixtures are used in the same batch, they shall be batched separately and must be compatible.

E. Control of Mixing Water: All materials shall be batched at the plant. However, where approved by the Contracting Officer, water may be added at the job site when the slump is less than specified and the water-cement ratio is less than the approved mix design permits. In this case, water may be added to bring the slump within the specified range without exceeding the approved water-cement ratio. The water shall be injected into the mixer under pressure, and the drum or blades turned a minimum of 30 additional revolutions at mixing speed. There shall be no further addition of water to the batch.

3.02 CONVEYING CONCRETE

A. Concrete shall be conveyed from mixer to forms as rapidly as possible, by methods which will prevent segregation or loss of ingredients.

3.03 PLACING CONCRETE

A. General: Concrete shall be handled from mixer to forms in a continuous manner until the approved unit of operation is completed. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers.

B. Consolidation: Immediately after placing, each layer of concrete shall be consolidated by internal vibrators. Vibrators shall not be used to transport concrete within the forms.

C. Time Interval Between Mixing and Placing: Mixed concrete which is transported in truck mixers or agitators, or concrete which is truck mixed, shall be discharged within 1-1/2 hours after introduction of the

cement to the aggregates, except that when the concrete temperature exceeds 95 degrees F. this time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after is has been discharged from the truck.

D. Warm Weather Requirements: Concrete placed during warm weather shall have the lowest temperature practicable to produce the required strength. The temperature of the concrete as placed shall not exceed 95 degrees F. except where an approved retarder is used. The mixing water and/or aggregates will be cooled, if necessary, to maintain a satisfactory placing temperature. In no case shall the placing temperature exceed 95 degrees F.

3.04 JOINTS

A. General: Joints shall conform to the details indicated and shall be perpendicular to the finished grade of the pavement.

B. Walkway Joints:

1. Expansion joints shall be placed in walkways at intervals of forty (40) feet or less and between all abutting structures. A premoulded, bituminous fiber, nonextruding concrete expansion joint material or equal, three-eighths (3/8) inches thickness, shall be used as filler material at each expansion joint. The expansion joint material shall be recessed one-quarter (1/4) of an inch from the surface of the sidewalk.

2. Scored joints shall be placed in walkways at intervals equal to the width of the walkway from expansion joints, i.e., 4-foot intervals for 4-foot wide walkway--maximum 10 feet. Scoring lines shall be straight and perpendicular to the line of work. After preliminary trowelling, the initial scoring for the block marking shall be made to a depth of 1/2 inch in order to ensure the scoring depth required. The work shall then be carefully trowelled to a smooth and even finish and the scoring markings rescored. The lines shall be made with jointer tools that will round the edges of scoring lines to a radius of 1/8 inch and to a depth of 3/8 inches. The finished joint opening, exclusive of radii, shall not be wider than 1/8 inch.

3.05 WOOD-FLOAT FINISH

A. The screeding shall be followed immediately by darbying or bull floating before bleeding water is present, to bring the surface to a true, even plane. After the concrete has stiffened so that it will withstand a person's weight without imprint and the water sheen has disappeared, it shall be wood-floated. After wood-floating, the surface shall be lightly steel trowelled, and then broomed with a fiber-bristle brush in a direction transverse to that of the main traffic.

3.06 CURING AND PROTECTION

A. General: All concrete shall be cured by an approved method for seven (7) days. Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the placement prior to placing concrete. Curing shall be accomplished by any of the following methods, or combination thereof.

B. Moist Curing: Concrete to be moist-cured shall be maintained continuously wet for the entire curing period. If water or curing materials used, stains or discolors concrete surfaces, it shall be cleaned. Horizontal surfaces shall be cured by ponding, by covering with a 2-inch minimum thickness of continuously saturated sand, or by covering with waterproof paper, polyethylene sheet, polyethylene-coated burlap or saturated burlap.

C. Membrane Curing: The surfaces shall be thoroughly moistened with water and the curing compound shall be applied to the surfaces as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period. The compound shall be applied in two-coat continuous operation by mechanical spraying equipment, at a uniform coverage of 150 square feet per gallons each coverage. Concrete surfaces which have been subjected to rainfall within three (3) hours after curing compound has been applied shall be resprayed by the method at the coverage herein specified. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and contamination during the curing period.

END OF SECTION

SECTION 02810

IRRIGATION SYSTEM

PART 1 GENERAL

1.01 REFER TO SECTION 01000 FOR GENERAL REQUIREMENTS.

1.02 APPLICABLE PUBLICATIONS

A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references.

1. American Society for Testing and Materials (ASTM) Standards:

a. D 1785-74, Polyvinylchloride (PVC) Plastic Pipe, Scheduled 40, 80, 120

b. D 22-41-74, Polyvinylchloride (PVC) Plastic Pipe (SDR-PR)

c. D 2464-74, Threaded Polyvinylchloride (PVC) Plastic Pipe Fittings, Schedule 80

d. D 24466-74, Socket-Type Polyvinylchloride (PVC)

e. D 2564-73a, Solvent Cements for PVC Plastic Pipe and Fittings

f. D 2774-72, Recommended Practice for Underground Installation of Thermoplastic Pressure Piping

g. A-120-73, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses

2. Federal Specifications

a. WW-P-421C, Pipe, Cast Gray and Ductile Iron, Pressure (For Water and Other Liquids)

b. WW-V-54d, Valve, Gate, Bronze (125, 150, and 200 and Int. AM-1 Pound, Threaded Ends, Flanged Ends, Solder End and Brazed Ends, for Land Use)

c. American National Standards Institute, Inc. (ANSI) Standards:

d. A21.6-1970, Cast-Iron Pipe Centrifugally Cast in Metal Molds, for Water and Other Liquids

e. A21.8-1970, Cast-Iron Pipe Centrifugally Cast in Sand-Lined Molds, for Water and Other Liquids

f. B16.3-1971, Malleable-Iron Threaded Fittings, 150 and 300 Pound

g. American Water Works Association (AWWA) Standards:

h. C500-71, Gate Valves 3-Inch through 48-Inch Water and Other Liquids

1.03 WORK SPECIFIED HEREIN

A. This section describes the labor, materials and installation requirements necessary to install an automatic irrigation system adequate to irrigate all plant materials, if any, in this project.

B. Excavation, trenching and backfilling for irrigation systems are in Section 02224.

C. Electrical work shall conform to the National Electric Code, latest edition.

1.04 SUBMITTALS

A. Record and As-Built Drawings

1. The Contractor shall provide and keep up to date a complete "as-built" record set of blue line, ozalid prints which shall be corrected daily and show every change from the original drawings and specifications and the exact "as-built" locations, sizes, and kinds of equipment. Prints for this purpose may be obtained from the Contracting Officer at no cost. This set of drawings shall be kept on the site and shall be used only as a record set.

2. These drawings shall also serve as work progress sheets. The Contractor shall make neat and legible annotations thereon daily as the work proceeds, showing the work as actually installed. These drawings shall be available at all times for inspection and shall be kept in a location designated by the Contracting Officer.

3. Before the date of final inspection, the Contractor shall transfer all information from the "as-built" prints to the final "as-builts" in the host project air force base preferred computerized drawing format. The drawing shall be provided to the Contracting Officer on a three 3.5” floppy diskettes.

4. The Contractor shall dimension from two permanent points of reference, building corners, sidewalk, road intersections, road station points, etc., the location of the following items (if applicable):

a. Connection to existing water lines.

b. Connection to existing electrical power.

c. All valves and backflow devices.

d. Routing of all irrigation (dimension max. 200 feet along routing).

e. Irrigation controllers.

f. Routing of control wiring.

g. Quick coupling valves.

h. Drip system riser assemblies.

i. Other related equipment as directed by the Contracting Officer.

j. All lettering on drawings shall be minimum 1/8 inch in size.

5. On or before the date of final inspection, the Contractor shall deliver the corrected and approved drawings to the Contracting Officer. Delivery of the drawings will not relieve the Contractor of the responsibility of furnishing required information that may be omitted.

1.05 JOB CONDITIONS

A. Contractor shall provide a 100% coverage, complete irrigation system as schematically diagrammed on the drawings. In-field layout shall provide heads at a consistent spacing not to exceed that shown on the plans for each type of head or an approved spacing, if there is an approved equipment substitution. Any major variation of in-field requirements to those specified in the drawings shall be reported to the Contracting Officer before beginning construction.

B. Contractor shall verify the installation of sleeving, if any, designated in other sections of work that will be used for irrigation and will directly impact the irrigation installation. Sleeving to be installed by the irrigation contractor shall be coordinated with other work to ensure quality and efficiency.

C. Above ground piping shall be galvanized steel.

D. Below ground piping: Pipe larger than four (4) inches shall be cast-iron or asbestos-cement or plastic, as specified on drawings. Pipe smaller than four (4) inches shall be plastic (PVC, Schedule 40) as specified on drawings.

PART 2 PRODUCTS

2.01 GENERAL

A. Materials shall conform to the respective specifications and other requirements specified below:

2.02 PIPE

A. Galvanized steel pipe, if any, shall conform to ASTM A 120, standard weight.

B. Plastic pipe shall conform to ASTM D 1785, Schedule 40 for pipe with solvent welded joints and Schedule 80 for pipe with threaded joints, or to ASTM D 2241, Type 1, grade 1, 315 psi for presssure lines and 200 psi for other lines for pipe with solvent welded joints. Pipe and fittings shall bear the seal of approval (NSF mark) of the National Sanitation Foundation's standard for plastic pipe and fittings for potable water service.

C. Cast-iron pipe, if any, shall conform to Federal Specification WW-P-421, Type II or III, Class 150, or ANSI A 21.6 or A 21.8, working pressure 150, with push-on or mechanical joints, unless otherwise shown.

2.03 JOINTS

A. Plastic pipe joints shall be solvent welded or threaded. Solvent for welded joints shall conform to ASTM D 2564. Use of pipe dope or solvents on threaded joints will not be permitted.

B. Fittings and Specials:

C. For galvanized steel pipe, steel fittings shall be galvanized and threaded fittings shall conform to ANSI B 16.3.

D. For plastic pipe, fittings shall conform to ASTM D 2464 or D 2466.

2.04 GATE VALVES

A. Gate valves shall be brass and shall be designed for a working pressure of not less than 150 psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of opening.

B. Valves smaller than 3 inches shall be all bronze and shall conform to Federal Specification WW-V-54, Type 1.

C. Valves 3 inches or larger shall be iron body, bronze mounted, and shall conform to AWWA C500.

2.05 BACKFLOW PREVENTION UNITS

A. Backflow prevention equipment shall meet all local code req uirements.

B. Backflow prevention unit(s) of the type(s) indicated shall be installed at the location(s) shown on the drawings. Where union connections are not provided as part of the unit, the Contractor shall provide and install a union or sleeve type coupling between the control valve and the inlet side of the unit. Pipe and fittings for backflow prevention units shall be galvanized steel. A minimum of five (5) feet of galvanized pipe shall be used on each side of this equipment.

2.06 SPRINKLERS

A. Single-nozzle, rotary pop-up sprinklers of the full or part circle pattern as indicated shall be of heavy-duty plastic case and internal brass construction actuated by impact drive with spring and level principle. Sprinkler seals shall be neoprene and bearings shall be dry seal type. Sprinklers shall be of one-piece housing type so that interior parts may be removed or replaced from top without removing housing from the riser. Sprinklers shall be equipped with break-up nozzle to regulate diameter, and free turning rubber covers to eliminate vandalism, injury, or damage. Full or part circle sprinklers shall be interchangeable in the same housing.

2.07 SPRINKLER CONTROL VALVES AND VALVE ACCESSORIES

A. Solenoid control valves shall be completely serviceable while installed in line or shall have a union connection on the downstream side; shall have body and bonnet constructed of heavy-duty glass-filled nylon, a flow control device; shall operate on approximately 24 volts, be normally closed, be slow-closing globe type; and shall be of the same manufacturer as the automatic controller used in the work.

B. Manual control valves shall be angle-pattern, globe type with integral union on the discharge (horizontal) end, with a cross on the valve stem for key operation.

C. Quick coupling valves shall be two-piece, spring-loaded, compression type, normally closed, opening against line pressure, and actuated by downward thrust against the valve. Body shall be of cast red bronze. Machined parts shall be fabricated from red brass. Valve washers and sealers for key stems shall be of a semi-rigid, non-metallic, material and shall be easily replaceable. Inlets shall be tapped for National Standard pipe thread of the pipe riser size or sizes shown on the drawings. Valves shall be suitable for a maximum operating pressure of 150 psi and shall be the standard product of a reputable manufacturer of quick coupling valves for turf sprinkling systems.

D. Valve Boxes and Covers:

1. Valve boxes shall be plastic. The boxes shall be such length as will be adapted, without full extension, to the depth of cover required over the pipe at valve location. Plastic boxes shall be a standard catalog product of a manufacturer regularly engaged in the manufacture of valve boxes. Plastic boxes installed in turfed areas shall have green covers. Boxes housing control valves shall have lockable covers. Plastic shall be rigid combination of polyolefin and fibrous inorganic materials.

E. Automatic Controllers:

1. Controllers shall be the product of a manufacturer regularly engaged in the production of turf sprinkler systems and shall be specifically designed for use on irrigation projects and shall be compatible with existing systems on the installation. Controller shall be suitable for operation on the available electrical supply and shall be capable of complete automatic and manual operation of stations, as specified on drawings. Control circuit voltage shall be less than 120 volts and be capable of operating up to two 24-volt AC electric remote control valves per station. Each controller shall have a master switch to disconnect controller from electric supply lines.

2. Housing: Each controller shall be enclosed in a tamperproof lockable metal housing. Exterior wall-mounted and pedestal-mounted controllers shall be weatherproof. Where more than one controller is installed in an irrigation system, a single-key shall open all cabinets. Two keys for each system shall be furnished.

3. Programming: Timing for each station shall be viable up to 99 minutes. The programming cycle shall be not less than 14 calendar days. Each station shall be independently times, scheduled, or omitted. Programming shall be changeable without special tools and without dissembling controller.

4. Charts: A chart showing clearly the areas serviced by each remote control valve shall be provided at each controller.

5. Electrical: Electrical wiring from controller to control valves shall be solid, single conductor, copper wire, type THW. Minimum wire size shall be No. 12. Ground wire shall be a different color from all others. Regardless of the number or location of valves connected to a single controller station, separate control

wires shall be run from the controller station to each valve. Wiring from controllers to source shall be installed in rigid steel, one-half (1/2) inch conduit, or as specified on drawings.

6. A master on/off button shall provide for system shut-down while maintaining programming. Electrical surge protection and lightning protection shall be an integral part of the controller and shall be provided on both the primary and circuit lines.

7. All programming shall be accomplished via keyboard entry with all readouts LED displayed.

8. Electrical characteristics shall be as follows:

a. Input	120-VAC, 60 Hz
b. Output	24.0 V, 60 Hz 1.1 AMP
c. Circuit Breaker	1.0 A slow blow

9 Construction details shall conform to the applicable requirements of the General Specifications for Traffic Signal and Highway Lighting System; The Traffic Signal Standard Drawings; the National Electrical Code, latest edition; and as specified on the drawings.

10. Wire connections to remote control valves and at wire splices shall be made with UL approved, sealant (cycohexanone) filled, water-tight wire connectors installed as recommended by the manufacturer.

2.08 PIPE BEDDING AND BACKFILL MATERIAL

A. Sand bedding material not less than two (2) inches thick shall be placed under pipe where trench excavation is in rock. The bottom of trenches shall be accurately graded to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its entire length. Backfill material shall be suitable for the required compaction and free from stones larger than one (1) inch in any dimension. Embedment for pipe shall be a minimum of one inch (1") of clean sand.

2.09 MISCELLANEOUS ITEMS

A. Service clamps, if any, shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable iron body with cadmium plated straps and nuts. Clamps shall have rubber gasket cemented to the body.

B. Tapping sleeve(s), if any, of the size(s) indicated for connection to existing main shall be the cast-iron, split-sleeve type with flange on the outlet, and with bolts, follower rings and gaskets on each end of the sleeve. Construc- tion shall be suitable for a maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets, and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve.

2.10 DRIP IRRIGATION

A. Polyethylene pipe for drip irrigation shall be of a type specifically manufactured for such use by Bowsmith, or approved equal.

B. The fittings for polyethylene pipe shall be "compression-type" and be supplied by the pipe manufacturer.

C. Emitters shall be self-cleaning and operate at pressures between 10 and 50 psi and be capable of delivering between 1.0 and 2.0 gph.

D. Emitters shall be compatible with the emitter tubing supplied. All emitters shall be supplied by a single manufacturer.

E. Polyethylene pipe and emitters shall be installed and staked down as recommended by the manufacturer.

2.11 PRESSURE REDUCTION RISER

A The pressure reduction riser shall consist of the pressure reducing valve, ball valve, wye strainer, check valve, valve box, and all appurtenances, or as specified on drawings.

B. The pressure reducing valve shall be a self-contained, single-seat, direct-acting, spring-loaded, diaphragm-actuated type. Valve shall be of all plastic construction, stainless steel body seat, composition seat discs, BUNA-N diaphragm with nylon insert and stainless steel springs. The valve shall have a maximum working pressure rating of 150 psi and shall be capable of regulating outlet pressure from 5 to 20 psi and have an adjustment screw for setting the pressure. The downstream pressure variance shall not exceed a rate of 0.44 psi for every 10 psi variance (increase or decrease) in upstream or source pressure. The valve shall have an integral "Shrader" pressure test valve.

C. The valve shall have 1/2-inch MPT inlet and 3/4-inch MHT female outlet.

D. The threaded in-line spring check valve, if any, shall have a body constructed of type 1 PVC. The valve stem shall be 18-8 stainless steel with BUNA-N poppet seal. The 1/2 pound spring shall be 18-8 stainless steel. The valve shall have male x female threads, 3/4 inch NPT.

E. The ball valve, if any, shall be construction of Type I PVC (body and handle). The stem seal shall be BUNA "N" with teflon ball seal. The valve shall be rated for a maximum working pressure of 150 psi and shall be rated for operation for temperatures between -4 degrees and 140 degrees F. Valve shall have female threads (3/4 inch NPT) inlet and outlet.

F. The wye strainer shall have a filter housing constructed of glass reinforced polypropylene plastic and the removable filter cylinder shall be manufactured of stainless steel and shall be 150 micron mesh. The filter shall have an effective filter area of 10 square inches with a gross filter area of 20 square inches. The cartridge housing shall have an integral 3/4-inch ball valve for flushing of the filter without removal of the cartridge.

2.12 EMITTER ASSEMBLY

A. The emitters shall be of pressure compensating a continuous flushing type known as a Groove and Flap Short Path Emitter. The case of the emitter shall be made of durable black, plastic material. It shall be resistant to temperature variation, ultraviolet radiation, smog (ozone), common liquid fertilizer and weed spray. The case shall completely encompass the diaphragm, protecting it from potentially harmful environmental factors.

B. The emitter shall be capable of continuous, self-flushing, clog-free operation with 150 micron mesh minimum filtration for 1/2 GPH and 150 mesh for 1 and 2 GPH emitter. The emitter shall be capable of being installed in any position and maintain its given flow characteristics. The emitter shall be non-adjustable and the flow regime shall be maintained by a flexible silicon rubber diaphragm.

C. The emitter shall function with a system pressure range of 20 psi minimum to 50 psi maximum.

D. The 2 GPH emitter shall be capable of delivering 2.05 gph at 20 psi, 1.75 gph at 50 psi.

E. The 1 GPH emitter shall be capable of delivering 1 gph at 20 psi, 1 gph at 50 p si.

F. The 1/2 GPH emitter shall be capable of delivering .5 gph at 20 psi, .45 gph at 50 psi.

G. The emitter distribution tubing between the emitter and the .580 ID emitter hose shall be .187 inch ID, .250 inch OD. The tubing between the emitter outlet and the point of discharge shall be vinylized .150 inch ID, .220 inch OD. All tubing shall fit tightly with the corresponding emitter barbs, adapters and discharge outlet openings.

2.13 FILTERS

A. The filter housing shall be constructed of glass reinforced polypropylene and the removable filter cylinder shall be manufactured of 150 mesh stainless steel effective filter area of 24 square inches. The cartridge housing shall have an integral 3/4 inch ball valve for flushing fot the filter without removal of the cartridge. Threads shall be 1 inch MPT.

PART 3 EXECUTION

3.01 GENERAL

A. Unless otherwise specified, installation of sprinklers, backflow prevention units, control valves, drain valves, meters and boxes shall conform to the details specified on drawings.

3.02 HANDLING

A. Pipe and accessories shall be handled so as to ensure delivery to the trench in sound, undamaged condition. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material at no additional cost to the Government.

B. Cutting of pipe shall be done in a neat and workman-like manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved-type mechanical cutter. Wheel cutters shall be used when practical.

1. Plastic pipe shall be cut square and all burrs, particles, and curls shall be removed.

C. Placing and Laying: Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the materials be dropped or dumped into the trench. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until jointing is completed. When work is not in progress, open ends of pipe, fitting, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings.

1. Plastic pipe shall be installed in accordance with the procedures recommended in ASTM D 2774 and as herein specified.

2. Tracer tape shall be installed with non-metallic (asbestos-cement or plastic) irrigation lines. See Section 02224 for additional information.

3.03 JOINTING:

A. Galvanized Steel Pipe: Threaded joints shall be made tight with a stiff mixture of graphite and oil, inert filler and oil, or with an approved graphite compound, applied with a brush to the male threads only. Compounds shall not contain lead.

B. Connections between different types of pipe and accessories shall be made with transition fittings approved by the Contracting Officer.

C. Pipe sleeves shall be installed with a minimum of off-set at the joints to permit easy installation and removal of the irrigation lines. All plastic lines shall be installed in sleeves under paved areas. Sleeves shall extend at least 12 inches beyond the edges of the pavement. Sizes of sleeves shall be as specified on drawings.

3.04 SETTING OF VALVES AND BOXES

A. Valves and valve boxes shall be installed where shown or directed, and shall be set plumb. Valve boxes shall be centered on the valves. Valves shall be located outside the area of roads and streets. Earth fill shall be carefully tamped around each valve or meter box to a distance of four (4) feet on all sides of the box, or to the undistrubed trench face if less than four (4) feet. Valves shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the valve shall be inspected in open and closed positions to ensure that all parts are in working condition.

3.05 SOLENOID CONTROL VALVES

A. Install solenoid control valves in locations as shown on the drawings, with a cover of eight (8) inches maximum over top of flow control stem. Install a union on downstream side of all valves not provided with a union type connection. Fit with valve box and cover. Top of valve box shall be one and one-half (1-1/2) inches above finish grade, or as specified on drawings.

3.06 REMOTE CONTROL WIRING

A. Connections of wiring, other than in the controller housing shall be made with epoxy encapsulated connectors. Where more than one wire is placed in trench, the wiring shall be taped together at maximum intervals of ten (10) feet.

3.07 TRENCHES

A. Trenches shall be excavated for minimum pipe depths of twelve (12) inches for laterals and eighteen (18) inches for main pipes. Expansion and contraction of pipe shall be compensated for as per pipe manufacturer's recommendations. See Section 02224 for backfilling specifications.

B. Piping under concrete shall be installed by jacking, boring, or hydraulic driving, as specified on drawings.

C. Adjust all heads for proper pattern, water flow, and distance. Adjust any pressure regulators to specified pressures or as directed in the field.

3.08 PRESSURE REDUCTION VALVE

A. At the initial installation, the pressure reducing valve shall be field adjusted to and maintained at the psi at the adjacent pressure check point as specified on drawings.

B. Immediately prior to the initial operation of any of the pressure reducing valves, all valves shall be retested and reset, if necessary. The Contractor shall, at the completion of the entire irrigation system, test and record the pressure readings at all pressure reducing valves. If any readings are not within the recommended pressure, they shall be reset and retested by the Contractor.

3.09 EMITTER ASSEMBLY

A. The emitter and distribution tubing shall be assembled using the manufacturer's recommended tools and accessories.

B. The maximum length of the distribution tubing shall be as detailed on the project drawings. In the event the distance in the field exceeds the maximum length, the Contractor shall extend the .580 ID emitter hose as required by adding a tee and shall add a flush valve at the end of each extension. This work, if necessary, shall be performed at Contractor's expense.

C. The emitter assembly as detailed on the drawings shall consist of the emitter unit, flexible polyethylene emitter distribution tubings (length as required) and molded polyethylene adapter.

3.10 EMITTER HOSE

A. The Contractor shall assume full responsibility for the correct installation of the emitter system as herein specified. All emitter hoses shall be flushed prior to and after installation of emitter assemblies. Attach flush valve at the end of each line. A round four to six (4 - 6) inch valve box with cover shall be installed over each flush valve.

3.11 FILTER

A. The filter shall be installed in manner that allows removal of the cartridge for visual inspection.

3.12 PROGRAMMING OF CONTROLLER TO MINIMIZE EROSION

A. The irrigation controller shall be programmed to operate the sprinklers in a duration and frequency to minimize erosion during and after plant establishment. Any such damage shall be repaired by the Contractor at no cost to the Government.

3.13 CONNECTION TO EXISTING WATERLINES

A. Where connections are made between new work and existing mains, the connections shall be made by using fittings to suit the actual conditions. Standard methods are readily available for making connections to various types of pipe, either under pressure or in the dewatered condition. Where made under pressure, these connections shall be installed according to the recommendations of the manufacturer of the pipe being tapped. Tapping of reinforced-concrete cylinder pipe shall be done in accordance with the manufacturer's recommendations. Where the manufacturer recommends that the taps be made by attaching the rubber-gasketed saddle to the outside of the pipe using U-bolts, the saddle shall be grouted in if necessary, the mortar coating shall be chipped away even with the hole in the saddle plate, the exposed circumferential wires shall be removed and the cylinder and concrete core drilled out, and the steel saddle and U-bolts shall be protected by concrete encasement.

B. Supply lines shall be connected to the main with a rigid connection, and shall have a gate valve located below the frostline. Fit with valve box and cover.

3.14 TESTS

A. After completion of the piping system and prior to backfilling and the installation of the sprinkler heads, the entire system shall be tested for leaks and thoroughly flushed under pressure to remove any dirt, scale, or other material. Lines shall be tested at 200 psi for one (1) hour duration. Cracked or defective pipe, fittings, or accessories disclosed in the pressure test shall be replaced by the Contractor with sound material at no additional cost to the Government, and the test shall be repeated until results are satisfactory to the Technical Representative.

B. No line shall be covered until inspection and approval has been given by the Contracting Officer.

C. Testing of plastic pipe shall not be done until all joints have had least twenty-four (24) hours to set and cure. During cold weather, forty-eight (48) hours elapsed time shall be allowed for setting prior to testing. No water under pressure shall come in contact with any joint during the specified curing period. In hot weather, water shall not be permitted to stand in pipes until after backfilling is completed. Water used in testing shall be drained from pipes after completion of testing.

3.15 COVERAGE TEST

A. When the irrigation system is completed, the entire system shall be adjusted and operated to demonstrate the water coverage is complete and adequate and that the system conforms to the requirements of the plans and specifications. All deficiencies and inadequacies resulting from defective or inadequate materials/ workmanship shall be corrected at no additional cost to the Government.

3.16 CLEAN-UP

A. Upon completion of the installation of the irrigation system and appurtenances, all debris and surplus materials resulting from the work shall be removed and disposed of properly off base.

3.17 ESTABLISHMENT

A. Contractor shall adjust heads in turf areas flush with finish grade prior to final completion of planting operations or as directed by the Contracting Officer.

B. See Section 02970 for additional establishment specifications.

END OF SECTION

SECTION 02811

DRIP IRRIGATION SYSTEM

PART 1 GENERAL

1.01 REFERENCES

A. Refer to Section 01000 for General Requirements.

1.02 APPLICABLE PUBLICATIONS

A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

1. American Society for Testing and Materials (ASTM) Standards:

a. D 1785-74 Polyvinylchloride (PVC) Plastic Pipe Schedules 40, 80, and 120

b. D 2241-74 Polyvinylchloride (PVC) Plastic Pipe (SDR-PR)

c. D 2464-74 Threaded Polyvinylchloride (PVC) Plastic Pipe Fittings, Schedule 80

d. D 2466-74 Socket-Type Polyvinylchloride (PVC) Plastic Pipe Fittings, Schedule 40

e. D 2564-73a Solvent Cements for Polyvinylchloride (PVC) Plastic Pipe and Fittings

f. D 2774-72 Recommended Practice for Underground Installation of Thermoplastic Pressure Piping

g. A-120-73 Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses

2. Federal Specifications:

a. WW-P-421C Pipe, Cast Gray and Ductile Iron, Pressure (For Water and Other Liquids)

b. WW-V-54D Valve, Gate, Bronze (125, 150, and 200 and Int AM-1 Pound, Threaded Ends, Flanged Ends, Solder End and Brazed Ends, for Land Use)

3. American National Standards Institute, Inc. (ANSI) Standards:

a. A21.6-1970 Cast-Iron Pipe Centrifugally Cast in Metal Molds, for Water and Other Liquids

b. A21.8-1970 Cast-Iron Pipe Centrifugally Cast in Sand-Lined Molds, for Water and Other Liquids

c. B16.3-1971 Malleable-Iron Threaded Fittings, 150 and 300 Pound

4. American Water Works Association (AWWA) Standards:

a. C500-71 Gate Valves 3-Inch through 48-Inch for Water and Other Liquids

1.03 SCOPE OF WORK

A. This section describes the labor, materials and installation requirements necessary to layout and install an automatic irrigation system adequate to irrigate all plant materials, if any, in this project.

B. Excavation, trenching, and backfilling for irrigation systems requirements are in Section 02224.

C. Electrical work shall conform to the National Electric Code, latest edition.

1.04 SUBMITTALS

A. Record and As-Built Drawings:

1. The Contractor shall provide and keep up to date a complete "as-built" record set of blue line ozalid prints which shall be corrected daily and show every change from the original drawings and specifications and the exact "as-built" locations, sizes, and kinds of equipment. Prints for this purpose may be obtained from the Contracting Officer at no cost. This set of drawings shall be kept on the site and shall be used only as a record set.

2. These drawings shall also serve as work progress sheets. The Contractor shall make neat and legible annotations thereon daily as the work proceeds, showing the work as actually installed. These drawings shall be available at all times for inspection and shall be kept in a location designated by the Contracting Officer.

3. Before the date of final inspection, the Contractor shall transfer all information from the "as-built" prints to the final "as-builts" if the original drawings are not in a high quality condition as determined by the Contracting Officer. All work shall be neat, in ink, and subject to the approval of the Contracting Officer.

4. The Contractor shall dimension from two (2) permanent points of reference, building corners, sidewalk, road intersections, road station points, etc., the location of the following items:

a. Connection to existing water lines.

b. Connection to existing electrical power.

c. All valves and backflow devices.

d. Routing of all irrigation lines (dimension max. 50 feet along routing).

e. Irrigation controller(s).

f. Routing of control wiring.

g. Quick coupling valves.

h Drip system riser assemblies.

I. Other related equipment as directed by the Contracting Officer.

5. All lettering on drawings shall be minimum 1/8 inch in size.

6. On or before the date of final inspection, the Contractor shall deliver the corrected and approved drawings to the Contracting Officer. Delivery of the drawings will not relieve the Contractor of the responsibility of furnishing required information that may be omitted.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store all materials under cover.

1.06 JOB CONDITIONS

A. Contractor shall provide a complete irrigation system as schematically diagrammed on the drawings. Any major variation of in-field requirements to those specified in the drawings shall be reported to the Contracting Officer before beginning construction.

B. Contractor shall verify the installation of sleeving, if any, provided in other sections of work that will be used for irrigation.

C. Above ground piping shall be galvanized steel.

D. Below ground piping: Pipe four (4) inches and larger shall be cast-iron, asbestos-cement or plastic, as specified on drawings. Pipe smaller than four (4) inches shall be plastic or galvanized steel, as specified on drawings. Pipe for sleeving shall be corrugated metal, galvanized steel, plastic or bituminized fiber pipe, as specified on drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials shall conform to the respective specifications and other requirements specified below:

B. Pipe:

1. Galvanized steel pipe, if any, shall conform to ASTM A 120, standard weight.

2. Plastic pipe shall conform to ASTM D 1785, Schedule 40 for pipe with solvent welded joints and Schedule 80 for pipe with threaded joints, or to ASTM D 2241, Type 1, Grade 1, 315 psi for pressure lines and 200 psi for other lines for pipe with solvent welded joints. Pipe and fittings shall bear the seal of approval (NSF mark) of the National Sanitation Foundation's standard for plastic pipe and fittings for potable water service.

3. Cast-iron pipe, if any, shall conform to Federal Specification WW-P-421, Type 11 or 111, class 150, or ANSI A 21.6 or A 21.8, working pressure 150, with push-on or mechanical joints, unless otherwise shown.

C. Joints:

1. Plastic pipe joints shall be solvent welded or threaded. Solvent for welded joints shall conform to ASTM D 2564. Use of pipe dope or solvents on threaded joints will not be permitted.

D. Fittings and Specials:

1. For galvanized steel pipe, steel fittings shall be galvanized and threaded fittings shall conform to ANSI B 16.3.

2. For plastic pipe, fittings shall conform to ASTM D 2464 or D 2466.

E. Gate Valves:

1. Gate valves, if any, shall be designed for a working pressure of not less than 150 psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of opening.

2. Valves smaller than 3 inches shall be all bronze and shall conform to Federal Specification WW-V-54, Type 1.

3. Valves 3 inches or larger shall be iron body, bronze mounted, and shall conform to AWWA C500.

F. Backflow Prevention Units:

1. Backflow prevention equipment, if any, shall meet all local code requirements.

2. Backflow prevention unit(s) of the type(s) indicated shall be installed above ground at the location(s) shown on the drawings. Where union connections are not provided as part of the unit, the Contractor shall provide and install a union or sleeve type coupling between the control valve and the inlet side of the unit. Pipe and fittings for backflow prevention units shall be galvanized steel. A minimum of five (5) feet of galvanized pipe shall be used on each side of this equipment from source as well as to valve assembly.

G. Irrigation Control Valves and Valve Accessories:

1. Remote control valves, if any, shall be completely serviceable while installed in line or shall have a union connection on the downstream side; shall have body and bonnet constructed of heavy-duty glass-filled nylon, a flow control device; shall operate on approximately 24 volts, be normally closed, be slow- closing globe type; and shall be of the same manufacturer as the automatic controller used in the work.

2. Manual control valves, if any, shall be angle-pattern, globe type with integral union on the discharge (horizontal) end, with a cross on the valve stem for key operation.

3. Quick coupling valves, if any, shall be two-piece, spring-loaded, compression type, normally closed, opening against line pressure, and actuated by downward thrust against the valve. Body shall be of cast red bronze. Machined parts shall be fabricated from red brass. Valve washers and sealers for key stems shall be of a semi-rigid, non-metallic, material and shall be easily replaceable. Inlets shall be tapped for National Standard pipe thread of the pipe riser size or sizes shown on the drawings. Valves shall be suitable for a maximum operating pressure of 150 psi and shall be the standard product of a reputable manufacturer of quick coupling valves for lawn sprinkling systems.

H. Valve Boxes and Covers:

1. Valve boxes shall be plastic. The words "gate valve", for gate valves; and "RCV" for remote control valves shall be cast in covers of boxes for the irrigation system. The boxes shall be such length as will be adapted, without full extension, to the depth of cover required over the pipe at valve location. Plastic boxes shall be a standard catalog product of a manufacturer regularly engaged in the manufacture of valve boxes. Plastic boxes installed in turfed areas shall have green covers. Boxes housing control valves shall have lockable covers. Plastic shall be rigid combination of polyolefin and
fibrous inorganic materials.

I. Automatic Controllers:

1. Controllers shall be the product of a manufacturer regularly engaged in the production of turf sprinkler systems and shall be specifically designed for use on irrigation projects. Controller shall be suitable for operation on the available electrical supply and shall be capable of complete automatic and manual operation of all stations, as specified on drawings. Control circuit voltage shall be less than 120 volts and be capable of operating up to two 24-volt AC electric remote control valves per station. Each controller shall have a master switch to disconnect controller from supply lines.

2. Housing: Each controller shall be enclosed in a tamperproof lockable metal housing. Exterior wall-mounted and pedestal-mounted controllers shall be weatherproof. Where more than one controller is installed in an irrigation system, a single-key shall open all cabinets. Two keys for each system shall be furnished.

3. Programming: Timing for each station shall be viable up to 99 minutes. The programming cycle shall be not less than 14 calendar days. Each station shall be independently timed, scheduled, or omitted. Programming shall be changeable without special tools and without dissembling controller.

4. Charts: A chart, encased in plastic, showing clearly the areas serviced by each remote control valve shall be provided at each controller.

5. Electrical: Electrical wiring from controller to control valves shall be solid, single conductor, copper wire, type THW, size recommended by the controller manufacturer except that minimum wire size shall be No. 12. Common wire shall be a different color from all others. Regardless of the number or location of valves connected to a single controller station, separate control wires shall be run from the controller station to

each valve. Wiring from controllers to source shall be installed in rigid steel, one-half (1/2) inch conduit, or as specified on drawings.

a. A master on/off button shall provide for system shut-down while maintaining programming. Electrical surge protection and lightning protection shall be an integral part of the controller and shall be provided on both the primary and circuit lines.

b. All programming shall be accomplished via keyboard entry with all readouts LED displayed.

6. Electrical characteristics shall be as follows:

a.	Input	120 VAC, 60 Hz
b.	Output	24.0 V, 60 Hz 1.1 AMP
c.	Circuit Breaker	1.0 A slow blow

J. Construction details shall conform to the applicable requirements of the General Specifications for Traffic Signal and Highway Lighting System; The Traffic Signal Standard Drawings; the National Electrical Code, latest edition; and as specified on the drawings.

K. Wire connections to remote control valves and at wire splices shall be made with UL approved, sealant (cycohexanone) filled, water-tight wire connectors installed as recommended by the manufacturer.

2.02 PIPE BEDDING AND BACKFILL MATERIAL

A. Sand bedding material not less than two (2) inches thick shall be placed under pipe where trench excavation is in rock. The bottom of trenches shall be accurately graded to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its entire length. Backfill material shall be suitable for the required compaction and free from stones larger than one (1) inch in any dimension. Embedment for pipe shall be a minimum of one (1) inch of clean sand.

2.03 MISCELLANEOUS ITEMS

A. Service clamps, if any, shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable iron body with cadmium plated straps and nuts. Clamps shall have rubber gasket cemented to the body.

B. Tapping sleeve(s), if any, of the size(s) indicated for connection to existing main shall be the cast-iron, split-sleeve type with flange on the outlet, and with bolts, follower rings and gaskets on each end of the sleeve. Construction shall be suitable for a maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets, and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve.

2.04 DRIP IRRIGATION:

A. Polyethylene pipe for drip irrigation shall be of a type specifically manufactured for such use by Bowsmith, or approved equal.

B. The fittings for polyethylene pipe shall be "compression-type" and be supplied by the pipe manufacturer.

C. Emitters shall be self-cleaning and operate at pressures between 10 and 50 psi and be capable of delivering between 1.0 and 2.0 gph.

D. Emitters shall be compatible with the emitter tubing supplied. All emitters shall be supplied by a single manufacturer.

E. Polyethylene pipe and emitters shall be installed and staked down as recommended by the manufacturer.

2.05 PRESSURE REDUCTION RISER

A. The pressure reduction riser shall consist of the pressure reducing valve, ball valve, wye strainer, check valve, valve box, and all appurtenances, or as specified on drawings

B. The pressure reducing valve shall be a self-contained, single-seat, direct-acting, spring-loaded, diaphragm-actuated type. Valve shall be of all plastic construction, stainless steel body seat, composition seat discs, BUNA-N diaphragm with nylon insert and stainless steel springs. The valve shall have a maximum working pressure rating of 150 psi and shall be capable of regulating outlet pressure from 5 to 20 psi and have an adjustment screw for setting the pressure. The downstream pressure variance shall not exceed a rate of 0.44 psi for every 10 psi variance (increase or decrease) in upstream or source pressure. The valve shall have an integral "Shrader" pressure test valve.

C. The valve shall have 1/2-inch MPT inlet and 3/4-inch MHT female outlet.

D. The threaded in-line spring check valve, if any, shall have a body constructed of type 1 PVC. The valve stem shall be 18-8 stainless steel with BUNA-N poppet seal. The 1/2 pound spring shall be 18-8 stainless steel. The valve shall have male X female threads, 3/4 inch NPT.

E. The ball valve, if any, shall be construction of type I PVC (body and handle). The stem seal shall be BUNA "N" with teflon ball seal. The valve shall be rated for a maximum working pressure of 150 psi and shall be rated for operation for temperatures between -4 degrees and 140 degrees F. Valve shall have female threads (3/4-inch NPT) inlet and outlet.

F. The wye strainer shall have a filter housing constructed of glass reinforced polypropylene plastic and the removable filter cylinder shall be manufactured of stainless steel and shall be 150 mesh. The filter shall have an effective filter area of 10 square inches with a gross filter area of 20 square inches. The cartridge housing shall have an integral 3/4-inch ball valve for flushing of the filter without removal of the cartridge.

2.06 EMITTER ASSEMBLY

A. The emitters shall be of pressure compensating a continuous flushing type known as a Groove and Flap Short Path Emitter. The case of the emitter shall be made of durable black, plastic material. It shall be resistant to temperature variation, ultraviolet radiation, smog (ozone), common liquid fertilizer and weed spray. The case shall completely encompass the diaphragm, protecting it from potentially harmful environmental factors.

B. The emitter shall be capable of continuous, self-flushing, clog-free operation with 200 mesh (minimum) filtration for 1/2 GPH and 150 mesh for 1 and 2 GPH emitter. The emitter shall be capable of being installed in any position and maintain its given flow characteristics. The emitter shall be non-adjustable and the flow regime shall be maintained by a flexible silicon rubber diaphragm.

C. The emitter shall function with a system pressure range of 5 psi minimum to 50 psi maximum.

D. The 2 GPH emitter shall be capable of delivering 2.05 gph at psi, 1.75 gph at 50 psi.

E. The 1 GPH emitter shall be capable of delivering 1 gph at 20 psi, 1 gph at 50 psi.

F. The 1/2 GPH emitter shall be capable of delivering .5 gph at 20 psi, .45 gph at 50 psi.

G. The emitter distribution tubing between the emitter and the .580 OD emitter hose shall be .187 inch ID, .250 inch OD. The tubing between the emitter outlet and the point of discharge shall be vinylized .150 inch ID, .220 inch OD. All tubing shall fit tightly with the corresponding emitter barbs, adapters and discharge outlet openings.

2.07 FILTER

A. The filter housing shall be constructed of glass reinforced poly-propylene and the removable filter cylinder shall be manufactured of 250 mesh stainless steel effective filter area of 27 square inches. The

cartridge housing shall have an integral 3/4 inch ball valve for flushing out the filter without removal of the cartridge. Threads shall be 1 inch MPT.

PART 3 EXECUTION

3.01 GENERAL

A. Unless otherwise specified, installation of sprinklers, backflow prevention units, control valves, drain valves, meters and boxes shall conform to the details specified on drawings.

3.02 HANDLING

A. Pipe and accessories shall be handled so as to ensure delivery to the trench in sound, undamaged condition. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material at no additional cost to the Government.

3.03 CUTTING

A. Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved- type mechanical cutter. Wheel cutters shall be used when practical.

B. Plastic pipe shall be cut square and all burrs, particles and curls shall be removed.

3.04 PLACING AND LAYING

A. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the materials be dropped or dumped into the trench. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until jointing is completed. When work is not in progress, open ends of pipe, fitting, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings.

B. Plastic pipe shall be installed in accordance with the procedures recommended in ASTM D 2774 and as herein specified.

C. Tracer tape shall be installed with all non-metallic (asbestos-cement or PVC) irrigation lines.

3.05 JOINTING

A. Galvanized Steel Pipe: Threaded joints shall be made tight with a stiff mixture of graphite and oil, inert filler and oil, or with an approved graphite compound, applied with a brush to the male threads only. Compounds shall not contain lead.

B. Connections between different types of pipe and accessories shall be made with transition fittings approved by the Contracting Officer.

3.06 PIPE SLEEVES

A. Pipe sleeves shall be installed with a minimum of off-set at the joints to permit easy installation and removal of the irrigation lines. All plastic lines shall be installed in sleeves under paved areas. Sleeves shall extend at least 12 inches beyond the edges of the pavement. Sizes of sleeves shall be specified on drawings.

B. Sleeves shall be capped or plugged in a manner acceptable to the Contracting Officer following installation and prior to placement of water piping.

3.07 SETTING OF VALVES AND BOXES

A. Valves and valve boxes shall be installed where shown or directed, and shall be set plumb. Valve boxes shall be centered on the valves. Valves shall be located outside the area of roads and streets. Earth fill shall be carefully tamped around each valve or

meter box to a distance of four (4) feet on all sides of the box, or to the undisturbed trench face if less than four (4) feet. Valves shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the valve shall be inspected in open and closed positions to ensure that all parts are in working condition.

3.08 REMOTE CONTROL VALVES

A. Install remote control valves in locations as shown on the drawings, with a cover of eight (8) inches maximum over top of flow control stem. Install a union on downstream side of all valves not provided with a union type connection. Fit with valve box and cover. Top of valve box shall be one and one half (1-1/2) inches above finish grade, or as specified on drawings.

3.09 REMOTE CONTROL WIRING

A. Connections of wiring, other than in the controller housing, shall be made with epoxy encapsulated connectors. Where more than one wire is placed in trench, the wiring shall be taped together at maximum intervals of ten (10) feet.

3.10 TRENCHES

A. Trenches shall be excavated for minimum pipe depths of eight (8) inches for laterals and twelve (12) inches for main pipes. Expansion and contraction of pipe shall be compensated for as per pipe manufacturer's recommendations. See Section 02224 for backfilling specifications.

3.11 PIPING UNDER CONCRETE

A. Piping under concrete shall be installed by jacking, boring, or hydraulic driving, as specified on drawings.

3.12 EMITTERS

A. Adjust all emitters for proper pattern, water flow, and distance. Adjust any pressure regulators to specified pressures or as directed in the field.

3.13 Pressure Reduction Riser

A. At the initial installation, the pressure reducing valve, if any, shall be field adjusted to 25 psi and maintained at 24-26 psi at the adjacent pressure check point.

B. Immediately prior to the initial operation of any of the pressure reducing valves on a continuous basis, all valves shall be retested and reset, if necessary. the Contractor shall, at the completion of the entire irrigation system, test and record the pressure readings at all pressure reducing valves. If any readings are not within the recommended pressure, necessary devices shall be reset and retested by the Contractor.

3.14 EMITTER ASSEMBLY

A. The emitter and distribution tubing shall be assembled using the manufacturer's recommended tools and accessories.

B. The maximum length of the distribution tubing shall be as detailed on the project drawings. In the event the distance in the field exceeds the maximum length, the Contractor shall extend the .580 OD emitter hose as required by adding a tee and shall add a flush valve at the end of each extension. This work, if necessary, shall be performed at Contractor's expense.

C. The emitter assembly as detailed on the drawings shall consist of the emitter unit, flexible polyethylene emitter distribution tubings (length as required) and molded polyethylene adapter.

3.15 EMITTER HOSE

A. The Contractor shall assume full responsibility for the correct installation of the emitter system, as herein specified. All emitter hose shall be flushed prior to and after installation of emitter assemblies. Attach manual self- closing flush valve at the end of each line. A round, four to six (4 - 6) inch valve box with cover shall be installed over each flush valve.

3.16 FILTER

A. The filter shall be installed in manner that allows removal of the cartridge for visual inspection.

3.17 PROGRAMMING OF CONTROLLER TO MINIMIZE EROSION

A. The irrigation controller shall be programmed to operate the emitters in a duration and frequency to minimize erosion during and after plant establishment. Any such damage shall be repaired by the Contractor at no cost to the Government.

3.18 ESTABLISHMENT

A. Contractor shall adjust emitters or spaghetti in all areas a maximum of one inch above settled, finished grade prior to final completion of establishment operations.

B. See Section 02970 for additional establishment specifications.

3.17 CONNECTION TO EXISTING WATERLINES

A. Where connections are made between new work and existing mains, the connections shall be made by using specials and fittings to suit the actual conditions. Standard methods are readily available for making connections to various types of pipe, either under pressure or in the dewatered condition. Where made under pressure, these connections shall be installed according to the recommendations of the manufacturer of the pipe being tapped. Tapping of reinforced concrete cylinder pipe shall be done in accordance with the manufacturer's recommendations. Where the manufacturer recommends that the taps be made by attaching the rubber-gasketed saddle to the outside of the pipe using U-bolts, the saddle shall be grouted in if necessary, the mortar coating shall be chipped away even with the hole in the saddle plate, the exposed circumferential wires shall be removed and the cylinder and concrete core drilled out, and the steel saddle and U-bolts shall be protected by the concrete casement.

B. Supply lines shall be connected to the main with a rigid connection, and shall have a gate valve located below the frostline. Fit with valve box and cover.

3.18 TESTS

A. After completion of the piping system and prior to backfilling and the installation of the sprinkler heads, the entire system shall be tested for leaks and thoroughly flushed under pressure to remove any dirt, scale, or other material. Lines shall be tested at 200 psi for one (1) hour duration. Cracked or defective pipe, fittings, or accessories disclosed in the pressure test shall be replaced by the Contractor with sound material at no additional cost to the Government, and the test shall be repeated until results are satisfactory to the Contracting Officer.

B. No line shall be covered until inspection and approval has been given by the Contracting Officer.

C. Testing of plastic pipe shall not be done until all joints have had least twenty-four (24) hours to set and cure. During cold weather, forty-eight (48) hours elapsed time shall be allowed for setting prior to testing. No water under pressure shall come in contact with any joint during the specified curing period. In hot weather, water shall not be permitted to stand in pipes until after backfilling is completed. Water used in testing shall be drained from pipes after completion of testing.

D. Coverage Test:

1. When the irrigation system is completed, the entire system shall be adjusted and operated to demonstrate the water coverage is complete and adequate and that the system conforms to the requirements of the plans and specifications. All deficiencies and inadequacies resulting from defective or inadequate materials/ workmanship shall be corrected at no additional cost to the Government.

E. Cleanup:

1. Upon completion of the installation of the irrigation system and appurtenances, all debris and surplus materials resulting from the work shall be removed and disposed of properly off base.

END OF SECTION

SECTION 02950

TREES, SHRUBS AND GROUNDCOVERS

PART 1 GENERAL

1.01 REFER TO SECTION 01000 FOR GENERAL REQUIREMENTS.

1.02 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American National Standards Institute (ANSI) Publication:
1. Z60.1, American Standard for Nursery Stock, latest edition.

1.03 WORK SPECIFIED HEREIN:

A. This section describes the labor, materials and installation requirements necessary to complete the tree, shrub, and groundcover planting and related items as indicated or specified.

1.04 SUBMITTALS

A. Written guarantee warranting the plant material to be in healthy condition one (1) year from the date of project acceptance; and that material that is not shall be replaced at no cost to the Government within 5 days of date stated in written notice. Warranty-replacement planting shall be warranted for one (1) year from the date of completion of all planting. See 1.06, WARRANTY.

B. Planting Schedule: Submit planting schedule showing dates for planting in each area of site.

C. Maintenance Instructions: Submit typewritten instructions recommending procedures for maintenance of landscape work for one full year 60 days prior to expiration of establishment.

D. Topsoil: Before delivery of topsoil, furnish Contracting Officer with written statement giving location of properties from which topsoil is to be obtained, names and addresses of owners, depth to be stripped, and crops grown during past 2 years.

1.05 WORK SITE CONDITIONS

A. Proceed with and complete landscape work as rapidly as portions of site become available, working with seasonal limitations for each kind of landscape work required.

B. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

C. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the Contracting Officer before planting.

D. Protection of turfed areas: Plant trees and shrubs after final grades are established and prior to planting of turf grass or seed unless otherwise specified. If planting of trees and shrubs occurs after turf work, protect turf areas and promptly repair damage to turf areas resulting from planting operations.

1.06 WARRANTY

A. Warranty plants for a period of one year after date of project acceptance against defects, disease, death, and unsatisfactory growth, except for defects resulting from neglect by Government, abuse or damage by others, or unusual phenomena or incidents which are beyond Contractor’s control.

B. Inspections:

1. A preliminary inspection will be held sixty days from the the beginning of the 120 day establishment period or six months from the beginning of the one year establishment period to determine plant health and overall acceptability. Plants not in healthy growing condition will be noted and shall be removed from the site and replaced with plants of the same species and size as originally specified. Replacement plants shall be warranted until the end of the existing one year period as described above. If highly unsatisfactory conditions exists, the Contracting Officer may extend the warranty period for replacement plants for a period of one full year after acceptance of the replacement planting.

2. A final inspection of the replacement plants will be conducted at end of extended warranty period, if any, to determine acceptance or rejection. This will be the final replacement.

1.08 DELIVERY, STORAGE, AND HANDLING

A. All plant material shall be inspected by the Contracting Officer at the job site upon delivery. Only plants approved for planting by the Contracting Officer shall be stored or planted. Contracting Officer reserves the right to refuse any plant material he deems unacceptable. Any and all rejected plant materials shall be removed from the job site on the day of rejection.

B. Each tree, shrub, groundcover flat, container of fertilizer, or other construction material shall be labeled by grower or manufacturer as separate items.

C. Plant identification labels shall be durable, using waterproof labels and weather-resistant ink. Labels shall be securely attached to plants, bundles, or containers of plants and shall state the correct botanical plant name and size.

D. Bulk deliveries of mulch, topsoil, and inert material shall be accompanied with delivery tickets showing weight, origin, and composition.

E. Plant Storage: Plants not installed on the day of arrival at the site shall be stored and protected. Outside storage locations shall be continually shaded and protected from the wind. Bare root plants shall be heeled-in. Plants stored on the project shall be protected from any drying at all times covering the balls or roots with moist sawdust, wood chips, shredded bark, peat moss, or other similar mulching material. All plants, including those in containers, shall be kept in a moist condition until planted.

F. Handling: Care shall be taken to avoid drying or damaging plants being moved from the nursery or storage area to the planting site. Balled and burlapped plants shall be handled carefully to avoid cracking or breaking the earth ball. Plants shall not be handled by the trunk or stems. Bare root plants shall be "puddled" when removed from the heeling-in bed to protect the roots from drying out. Plants shall be protected from freezing or drying by a covering of burlap, tarpaulin, or mulching material during transportation from the heeling-in bed to the planting site. Damaged plants will be rejected and shall be removed from the site.

1.09 JOB CONDITIONS

A. The Contractor shall receive the site with the planting areas free of waste or debris developed by other trades. Any discrepancy from such conditions shall be reported to the Contracting Officer before beginning construction.

PART 2 PRODUCTS

2.01 COMMERCIAL FERTILIZERS

A. Ground ferrous sulfate containing not less than 20% iron and not less than 30% sulphur as manufactured by Duvall or an approved equal.

B. Agricultural grade gypsum.

C. Ammonium phosphate 16-20-0.

D. Super phosphate.

E. Sulfate of Ammonia 21-0-0.

F. Vitamin B-1 root stimulator.

2.02 ORGANIC AMENDMENTS

A. Mulch shall be approved nitrogenized sawdust or fir bark mulch.

2.03 TREE STAKING

A. Tree stakes shall be as detailed in drawings and shall be free of knots and cracks.

B. Tree ties shall be pliable galvanized wire of #10 gauge; provide a minimum of two (2) per tree.

C. Hose covering shall be two ply, reinforced, black or green rubber garden hose of at least 1/2" diameter.

2.04 HERBICIDE

A. Pre-emergent herbicide shall be Surflan 75W as manufactured by Elanco Chemical Company, or approved equal.

B. Non-selective contact herbicide shall be Round-Up as manufactured by Monsanto, or approved equal.

2.05 PLANT MATERIAL

A. Trees, shrubs, and groundcovers shall be grown in pots, tubs, cans, boxes, or flats as scheduled and shall conform to ANSI Z60.1. Plants shall have sufficient roots to hold earth intact after rootball is removed from the container without being rootbound.

Plants shall be approved or rejected at the Contracting Officer's discretion for damage, health, form, and size at any time before planting. Plant materials that are poor in health or damaged prior to substantial completion or during the the warrantee period will be identified by the Contracting Officer and shall be replaced by the Contractor within five (5) days of written notice.

B. Planting stock shall be well-branched and well-formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects or insect eggs and shall have healthy, normal, and unbroken root systems. Plants shall have been grown under climatic conditions similar to those in the locality of the project.

C. Plants designated "collected", if any, shall be obtained from native stands or established plantings. To be acceptable, collected plants shall have been growing in favorable locations in a soil which ensured good fibrous root development and a vigorous growing condition. The minimum root spread for collected bare root plant materials shall be one-third greater than minimum root spread of bare root, nursery-grown stock; minimum ball sizes for collected plant materials obtained balled and burlapped shall be the next larger ball size than for nursery-grown stock sized in accordance with ANSI Z60.1.

2.06 MULCH

A. Mulch shall be free from deleterious materials and shall be stored so as to prevent inclusion of foreign materials.

PART 3 EXECUTION

3.01 PLANTING BED PREPARATION

A. Prepare planting beds by applying Round-Up as per label directions to weed or grass growth in planting areas on site. Allowing sufficient time for herbicide to take effect, scarify planting areas to a minimum depth of six (6) inches. Bring beds to grade and rake to remove weeds, clods, or rocks one inch in diameter or greater. Thoroughly water-settle all soil.

B. Stake plant material locations prior to planting for approval by the Contracting Officer.

3.02 PROTECTION OF EXISTING VEGETATION

A. If turf areas have been established prior to planting operations, the surrounding turf shall be covered before excavations are made in a manner that will protect turf areas. Existing trees, shrubbery, and beds that are to be preserved shall be barricaded in a manner that will effectively protect them during planting operations.

3.03 UNDERGROUND OBSTRUCTIONS TO PLANTING

A. If underground utilities, construction, or solid rock ledges are encountered, other locations for planting may be selected by the Contracting Officer.

B. Planting beds being prepared for groundcover or annual plantings shall have three (3) cubic yards of mulch, twenty (20) pounds of ammonium phosphate, and one hundred fifty (150) pounds of gypsum per one thousand square feet (1000 SF), incorporated into the top six inches of the bed.

3.04 PLANT PITS

A. Plant pits for container grown plant material shall be excavated twice the size of the container diameter of the plant being planted, or as shown in the drawings.

B. Plant pits shall be dug to produce vertical sides and flat, uncompacted bottoms. When pits are dug with an auger and the sides of the pits become glazed, the glazed surface shall be scarified. The size of plant pits shall be as shown on planting details.

C. Remove plants from containers without disturbing the rootball. Set plants in pit, cradling and supporting the rootball. Position plant for the "best side" view and for minimum obstruction to traffic on adjacent pavement, if applicable.

D. Bare-root stock, if any, shall be planted so that the roots are arranged in a natural position. Damaged roots shall be removed with a clean cut. Planting soil mixture shall be carefully worked in among the roots. Remainder of backfill of planting soil mixture shall be tamped and watered. Water basins shall then be formed around isolated plants as specified on drawings below the final grade of the surrounding area to facilitate the passive harvesting of normal rainfall.

E. Backfill pit with a blended mixture containing one part mulch, three parts native soil, one-eighth part gypsum, and one-eighth cup of ground ferrous sulfate per cubic yard of backfill. When the plant is set and the backfill has been water-settled, the top of the rootball shall be at finish grade or as shown .

F. Apply Vitamin B-1 Root Stimulator at the rate of one tablespoon per gallon to all bare root stock plant materials. Thoroughly water each plant with a minimum of 5 gallons of the mixed B-1 solution.

G. Raised planter mix, if any, shall contain 40% sandy loam, 60% approved ground mulch, 10 pounds of superphosphate, 20 pounds of ammonium sulfate and 5 pounds of ground ferrous sulfate per 10 cubic yards of planter mix.

H. Mulch all plant pits, shrub beds, and groundcover beds with a two (2) inch depth of approved ground mulch immediately after planting.

3.05 TREE STAKING

A. Stake trees as per detail.

3.06 PRUNING

A. Prune each tree and shrub to preserve the natural character of the plant per ANSI Z60.1. Prune to remove all suckers, deadwood, and broken or badly bruised branches.

B. Deciduous trees and shrubs shall be pruned to reduce total amount of anticipated foliage by one-fourth. Typical growth habit of individual plants shall be retained with as much height and spread as is practicable. Cuts shall be made with sharp instruments, and shall be flush with trunk or adjacent branch to ensure elimination of stubs. "Headback" cuts at right angles to line of growth shall not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off." Trimmings shall be removed from the site.

3.07 EXISTING TURF AREAS

A. Existing turf areas, if any, that have been damaged or scarred during planting operations shall be restored to their original condition.

3.09 SEE SECTION 02970 FOR ESTABLISHMENT SPECIFICATIONS.

END OF SECTION

SECTION 02951

SEEDED TURF INSTALLATION

PART 1 GENERAL

1.01 REFER TO SECTION 01000 FOR GENERAL REQUIREMENTS.

1.02 WORK SPECIFIED HEREIN

A. This section describes the labor, materials and installation requirements necessary to complete the seeded turf planting and related items as indicated or specified.

1.03 SUBMITTALS

A. Inspection certificated by State, Federal and others indicating the origin and health of turf seed material.

B. Sample of seed analysis for approval.

C. Written guarantee warranting a full stand of turf to be in healthy condition 120 calendar days from the date of final construction inspection; and that turf that is not shall be reseeded at no cost to the Government within five (5) days of written notice. Warranty-replacement turf shall be warranted for 120 calendar days from the date of completion of all planting.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Each seed container, container of fertilizer, or other material shall be labeled by grower or manufacturer as separate items.

B. Bulk deliveries of seed shall be accompanied with delivery tickets specifying percentage germination, purity, and noxious weed seed content.

C. Seed shall be kept in dry storage away from contaminants, insects and rodents.

1.05 JOB CONDITIONS

A. The turf areas will be free of waste or debris developed by other trades. Any discrepancy from such conditions shall be reported to the Contracting Officer before beginning construction.

1.06 GRADING

A. Contractor shall grade all turf areas as noted on drawings.

B. Contractor shall fine grade all turf areas eliminating rough or low areas to ensure positive drain age.

C. Any other areas not covered specifically above shall be graded to leave a generally smooth appearance conforming to standard landscape practices defined as: The final surface shall be raked; all objectionable materials, trash, brush, weeds, and stones larger than one inch shall be removed from the site and disposed of properly off base.

1.07 PLANTING SEASON

A. The planting of turf seed specified on drawings shall be performed during the following timeframe: _____ to _____.

PART 2 PRODUCTS

2.01 COMMERCIAL FERTILIZERS

A. Ground ferrous sulfate containing not less than 20% iron and not less than 30% sulphur as manufactured by Duvall or an approved equal.

B. Super phosphate.

C. Sulfate of Ammonia 20-0-0.

D. Potash.

2.02 ORGANIC AMENDMENTS

A. Mulch shall be approved fir bark mulch.

2.03 LANDSCAPE SUPPLIES

A. Lawn headers, if any, shall be as noted and detailed in drawings.

2.04 HERBICIDE

A. Contact herbicide shall be Round-Up as manufactured by Monsanto, or approved equal.

2.05 TURF SEED

A. Turf seed to be as specified on drawings.

B. Seed shall be certified seed to be the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures and pure live seed. Seed shall be labeled in conformance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. Weed seed shall not exceed one (1) percent by weight of the total mixture.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Prepare site by applying Round-Up as per label directions to weed growth on site. Allowing sufficient time for herbicide to take effect, scarify planting areas to a minimum depth of six (6) inches. Float beds to grade and rake to remove weeds, clods, or rocks one inch in diameter or greater. Thoroughly water-settle all soil.

B. Seeded lawn areas shall be prepared by incorporating 5 pounds sulfate of ammonia, 5 pounds of potash, and 15 pounds super phosphate per 1000 square feet into the top 6 inches of the soil surface prior to broadcasting seed.

C. Turf shall be seeded at the rate specified on the drawings.

3.02 SEE SECTION 02970 FOR ESTABLISHMENT SPECIFICATIONS

END OF SECTION

SECTION 02952

SODDED TURF INSTALLATION

PART 1 GENERAL

1.01 REFER TO SECTION 01000 FOR GENERAL REQUIREMENTS.

1.02 APPLICABLE PUBLICATIONS

A. American Sod Producers Association, Inc. (ASPA) Publication:

1. Guideline Specifications to Sodding (Undated).

1.03 WORK SPECIFIED HEREIN

A. This section describes the labor, materials and installation requirements necessary to complete the sodded turf planting and related items as indicated or specified.

1.04 SUBMITTALS

A. Inspection certificated in duplicate by State, Federal and others indicating the origin and health of the sod.

B. Written guarantee warranting the sod to be in healthy condition 120 calendar days from the date of final construction inspection; and that sod that is not shall be replaced at no cost to the Government within 14 days of written notice. Warranty-replacement sod shall be warranted for 120 calendar days from the date of planting.

1.05 DELIVERY, STORAGE, AND ACCEPTABILITY

A. All sod shall be reviewed by the Contracting Officer at the job site prior to installation. Contracting Officer reserves the right to refuse any sod he deems unacceptable.

B. Each palette, flat, or specified group of sod shall be labeled by grower or manufacturer as separate items.

C. During delivery, sod materials shall be protected from any drying or contamination by detrimental material.

D. Turfing materials shall be sprinkled with water and covered with moist burlap, straw, or other approved covering and protected from exposure to wind and direct sunlight. Covering shall be such that air can circulate and heating will not develop.

1.06 HANDLING

A. Sod shall not be dropped or dumped from vehicles.

1.07 JOB CONDITIONS

A. The sod areas will be free of waste or debris developed by other trades. Any discrepancy from such conditions shall be reported to the Contracting Officer before beginning construction.

1.08 GRADING

A. Contractor shall grade all sod areas as noted on drawings.

B. Contractor shall fine grade all turf areas eliminating rough or low areas to ensure positive drainage.

C. Any other areas not covered specifically above shall be graded to leave a generally smooth appearance conforming to standard landscape practices defined as: The final surface shall be raked; all objectionable materials, trash, brush, weeds, and stones larger than one (1) inch shall be removed from the site and disposed of properly off base.

1.09 PLANTING SEASON

A. The planting of sod shall be performed during the following timeframe: _____ to _____.

PART 2 PRODUCTS

2.01 COMMERCIAL FERTILIZERS

A. Ground ferrous sulfate containing not less than 20% iron and not less than 30% sulphur as manufactured by Duvall or an approved equal.

B. Ammonium phosphate 16-20-0.

2.02 ORGANIC AMENDMENTS

A. Mulch shall be approved nitrogenized sawdust or fir bark mulch.

2.03 LANDSCAPE SUPPLIES

A. Lawn headers, if any, shall be as noted and detailed in drawings.

2.04 HERBICIDE

A. Contact herbicide shall be Round-Up as manufactured by Monsanto, or approved equal.

2.05 MATERIAL

A. Sod type to be as specified on drawings.

B. Sod shall be field-grown in same climatic conditions as that of the project site.

C. Sod shall be strongly rooted, not less than two (2) years old, free of weeds and undesirable native grasses. Sod must be capable of growth and development when planted. Sod strips to be not more than fifteen (15) inches wide by four (4) feet long. Sod type to be as noted in drawings.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Prepare site by applying Round-Up as per label directions to weed growth on site. Allowing sufficient time for herbicide to take effect, scarify planting areas to a minimum depth of six (6) inches. Float beds to grade and rake to remove weeds, clods, or rocks one inch in diameter or greater. Thoroughly water-settle all soil.

B. Work shall be performed only during periods when beneficial results are likely to be obtained.

C. Sodded lawn areas shall be receive eight (8) pounds of ammonium phosphate, three (3) cubic yards of mulch, and six (6) pounds of ground ferrous sulfate evenly incorporated into the soil per thousand square feet (1000 SF) prior to planting. These areas shall be rolled to remove all potential and actual air pockets in the soil prior to planting.

D. Immediately prior to sodding, all areas to be sodded shall be watered, wetting the soil to a depth of 4 inches.

3.02 INSTALLATION

A. Sodding shall be accomplished in accordance with the ASPA Guideline Specifications to Sodding.

B. Sod shall be laid with closely fitted joints, and ends of the strips shall be staggered.

C. On irregular-shaped areas, sod shall be laid in both directions from the longest straight line that can be drawn through the area.

D. Additionally, sod shall be laid at right angles to slopes or the flow of water. On slope areas, sodding shall be started at the bottom of the slope.

E. Sod shall be rolled with a minimum 300 pound roller after an initial watering to eliminate irregularities. CAUTION: Immediate initial watering is very important to sod survival.

F. Do not over-irrigate, creating a spongy condition for roller. After rolling, water thoroughly to penetrate subsoil at least 8" to 10".

G. Repeat watering at regular intervals to keep sod moist at all times until rooted.

3.03 CLEAN-UP

A. Remove all waste and debris; clean all pavement of soil and mulch created by operations in this scope of work from site.

3.04 SEE SECTION 02970 FOR ESTABLISHMENT SPECIFICATIONS.

END OF SECTION

SECTION 02960

INERT MATERIAL

PART 1 GENERAL

1.01 REFER TO SECTION 01000 FOR GENERAL REQUIREMENTS.

1.02 WORK SPECIFIED HEREIN:

A. This section described the labor, materials and requirements necessary to complete the installation of inert material and related items as indicated or specified.

1.03 SUBMITTALS

A. Sample of each inert material specified on drawings for approval.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Each inert material shall be labeled by supplier or manufacturer as separate items. Bulk deliveries shall be accompanied with delivery tickets. One delivery ticket shall be provided to the Contracting Officer.

1.05 JOB CONDITIONS

A. All areas will be free of waste or debris developed by other trades. Any discrepancy from such conditions shall be reported to the Contracting Officer before beginning construction.

PART 2 PRODUCTS

2.01 INERT MATERIALS

A. Grade and/or color shall be as specified on drawings.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Prepare site by applying Round-Up as per label directions to weed growth on site if this work has not already been performed as specified in another section, if any, of this contract. Float area(s) to grade and rake to remove weeds, clods, or rocks one inch in diameter or greater. Thoroughly water-settle all soil.

B. Clearing and Grading: Clearing shall consist of the satisfactory removal and disposal of

brush, snags, and rubbish occurring within the area shown. Clearing shall be accomplished by hand within five (5) feet of existing vegetation to be left standing.

3.02 INERT MATERIAL

A. Areas shall be floated and raked to a finish subgrade prior to installation as specified on drawings or details.

B. Inert materials shall be applied, raked, and lightly broomed to the finish grade. Thoroughly water settle to dissipate the fines.

3.04 PRE-EMERGENT

A. Apply as per label directions to complete operation.

3.05 CLEAN-UP

Remove all waste and debris; clean all pavement of inert material remnants created by operations in this scope of work from site.

3.06 SEE SECTION 02970 FOR ESTABLISHMENT SPECIFICATIONS.

END OF SECTION

SECTION 02970

120-DAY LANDSCAPE ESTABLISHMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This work shall include all labor, materials, equipment, supplies, and services to sustain and maintain in healthy, attractive and safe condition for all trees, shrubs, groundcovers, annuals, perennials, and turf. It shall also include the proper clean-up and off site disposal of all clippings, prunings, etc., generated in the process. All work shall be in full compliance with procedures and techniques as described and outlined in this contract.

B. The 120-day landscape establishment schedule, itemized in Section 4.01, shall start at date of construction acceptance of the project.

1.02 WORK UNDER THIS PROJECT

A. The following items are a general description of the project for guidance only and shall not be construed as a complete detailed list of all operations to be performed.

B. Maintain all landscape plant materials.

C. Regularly check landscape irrigation system.

D. Control and eliminate weeds in mulched areas, turf areas, planting beds, and inert materials.

E. Control and eliminate pests.

F. Mow and edge turf.

1.03 QUALIFICATIONS OF CONTRACTOR PERSONNEL

A. All persons utilized by the Contractor in the performance of this contract shall be fully qualified, professional gardeners with experience in the grounds maintenance field. This experience must have provided, as a minimum, broad knowledge of all phases of landscape pest and disease control; shrub and tree pruning; fertilization; and irrigation system operation, maintenance and repair.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 PERFORMANCE

A. All work shall be performed in a professional manner within the standards of the industry, using quality equipment, methods and materials.

B. Work Schedule: Contractor will supply the Contracting Officer with a proposed scheduling of the expected day and time tasks listed below will be performed. This schedule shall be approved prior to project maintenance commencement.

C. The frequencies of the tasks stated are suggested minimums only. During extremely wet or dry periods, the Contractor must adjust schedules to ensure correct and proper conditions are maintained.

3.02 SHRUBS AND TREES

A. All shrubs and trees shall receive no less than the following:

B. Eliminate all bracing and supports as rapidly as plants can become self-supporting.

C. Supports that must remain should be kept in good repair and functioning at all times, and trees or shrubs fully protected. Supports or braces shall be repositioned as often as necessary to prevent damage to the tree or shrub trunk.

D. All debris resulting from care of shrubs, trees and other plant areas shall be removed from site on day work is performed and area cleaned.

E. Side shoots or branches may be "headed back" but are to be left on and encouraged on all thin or spindly tree trunks and on all trees still needing bracing or staking.

F. Sucker growth from the base of trees at soil level or below shall be removed, unless otherwise directed.

G. Pruning shall be provided to encourage a healthy natural growth pattern for each variety of tree or shrub.

H. All pruning shall be towards developing the natural branching structure. All pruning shall be accomplished in accordance with accepted practices and standards.

I. All plants will be fertilized with a balanced fertilizer according to schedule, Section 4.01.

J. Fertilizer used will be a balanced type supplying all nutrients required of the plant. Application rate will be as follows: a minimum of 1 pound actual nitrogen shall be applied to each plant over 5 gallon container size or its equivalent. Plants smaller than 5 gallon shall receive 1/4 to 1/2 pound actual nitrogen.. Application will be at the base, on drip line.

K. The Contractor is responsible for ensuring the correct soil conditions are maintained for each tree, shrub, flower, grass or plant covered under this contract in order to promote optimum growth, environment and health for the species of plant. This may require addition of soil, soil amendments, humus, mulch, gypsum, sulphur, all of which will be provided by the Contractor at no additional cost to the Government.

3.03 ESTABLISHMENT

A. Begin establishment immediately after planting.

B. Maintain plants in temporary location as well as final location. See Section 02950, 1.07, SPECIAL PROJECT WARRANTY

C. Turf watering shall be at intervals to obtain a moist soil condition to a minimum depth of 2 inches. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Run-off, puddling, and wilting shall be prevented

D. A balanced fertilizer shall be applied at the rate of 5 pounds actual nitrogen per 1000 square feet according to the schedule in Section 4.01.

E. Groundcovers shall be kept free of bermudagrass and nutgrass at all times.

F. Weeds, trimmings, etc., will be removed from site on day work is performed and area cleaned.

3.04 IRRIGATION SYSTEM AND WATERING

A. Make adjustments and settings of automatic controllers, if any, to establish frequency and length of watering periods. During the contract period, the Contractor will repair or replace any equipment damaged as a result of contract operations at the Contractor's expense.

B. Sprinkler system shall not be operated when extremely windy or freezing conditions prevail.

C. Watering cycles shall be timed to cause the least inconvenience to the building occupants and visitors. Entrances shall not be wet during the arrival and departure of occupant employees/residents.

D. Sprinkler heads on a continuing basis will be cleaned, adjusted, repaired, and maintained at a proper height.

E. When irrigating turfed areas, Contractor must make sure that sprinkler heads are adjusted to cover turf areas and shrubs and that sprinkler heads are clean so the water comes out evenly. The Contractor is responsible for ensuring that all turf, groundcovers, shrubs and trees are adequately watered at all times, whether or not sprinklers are provided.

3.05 CULTIVATION

A. Groundcover and annual flower beds will be cultivated to maintain a loose, friable top soil for the purposes of gas exchange, water penetration and soil aeration.

3.06 LANDSCAPE INSECT, RODENT AND DISEASE CONTROL

A. The Contractor is to implement an integrated pest management program for the control and eradication of pests and and plant diseases.

B. Chemicals used, methods of application and reporting procedures will fully comply with all provisions of Sections 3.08, 3.09 and 3.10.

C. The Contractor shall furnish services necessary to exterminate rodents and insects using only those pesticides which comply with the provisions of the Federal Insecticide, Fungicide and Rodenticide Pesticide Control Act of 1972, Public Law 92516 (86 Stat. 973), and the regulations issued thereunder.

D. These services shall be performed by a licensed pest control contractor or state-certified chemical applicator.

3.07 INITIAL SERVICE:

A. A thorough inspection of the premises shall be conducted to locate any infestation and intensive treatment made to eliminate any existing problems during the first month of the establishment portion of the contract.

3.08 FOLLOW-UP SERVICE

A. Additional inspections and treatment will be made as scheduled and/or required.

3.09 SAFETY PRECAUTIONS

A. In order to safeguard both life and property, the Contractor will adhere to the following:

B. Appropriate protective clothing and gear consistent with the type of pesticide being used shall be provided and worn during application. All containers holding pesticides shall be properly labeled with the name and strength of the chemical agent therein. Pesticides, herbicides and other toxic materials will not be stored on Government property.

C. A large number of pesticides or groups of pesticides are designated as restricted materials; their use and possession are subject to special restrictions under regulations of the State Department of Agriculture. Included in this list are insecticides, fumigants, mercury-treated seeds, rodenticides and avicides. In addition, certain herbicides are also classified as restricted materials. A permit from the appropriate local authorities must be obtained for use of any of these restricted materials. Before using any material listed in this group, contact the Agricultural Commissioner to determine the status of the chemical and for information regarding regulations concerning pesticide storage, transportation and disposal.

3.10 SCHEDULES AND REPORTS

A. Chemicals and methods and rates of application will be submitted to the Contracting Officer for approval prior to use. Until the end of the establishment period, the Contractor shall provide the Contracting Officer a detailed monthly report of all fertilizers and pesticides applied during the preceding month. The report shall include the chemical names, trade names, date and rate of application, specific areas of application and the purpose for the application.

3.11 GENERAL INSTRUCTIONS

A. Any eroded areas shall be repaired by the replacement of the proper material to bring them back to original grade as required.

3.12 CLEANUP AND PROTECTION

A. During landscape work, keep pavements clean and work areas in an orderly condition.

B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

C. All clippings, trimmings, cuttings, trash and debris resulting from work of this contract shall be promptly removed from the site.

PART 4 SCHEDULES

4.01 120-DAY LANDSCAPE ESTABLISHMENT SCHEDULE

Item	Work Item Description	Frequency	Time Frame
1	Prune Trees	Once	
2	Prune Shrubs	Once	4th Month
3	Trim & Edge Groundcovers	Monthly	
4	Mow & Edge Turf	Weekly	
5	Fertilize Trees, Shrubs, Groundcovers, and Turf	Once	4th Month
6	Irrigate Plants	3x Week	
7	Irrigate Turf	3x Week	
8	Weed All Areas	2x Month	
9	Apply Pre-Emergent Herbicide	Once	4th Month
10	Ensure Soil Conditions	Once	2nd Month
11	Cultivate Flower Beds	Once	2nd Month
12	Insect, Rodent, & Disease Control	Monthly	
13	Rake Inert Material Areas	Monthly	
14	Police Site	Weekly	

END OF SECTION